MP MASTER
MA32870

RF Generator

PM 112

!WARNING!

THE HIGH VOLTAGE REGULATOR BOARD, ASSEMBLY C034095D, FOR THE GENERATOR S/N _____, HAS BEEN CONDITIONED TO OPERATE AT _____ Hz. OPERATION AT _____ Hz MAY RESULT IN SERIOUS DAMAGE.

Contents

Page	Section
5	Introduction
5	General description
5	Specifications
7	Installation
7	Unpacking and handling
7	Installing or replacing the power tube
10	Operating the generator
10	Controls and indicators
12	Operating procedure
13	Theory of Operation
13	Functional description
15	Circuit description
15	Power amplifier
15	Radio-frequency coupler
16	Oscillator
16	RF regulator
17	Vacuum circuit
17	Vacuum trigger
18	5 Torr detector circuit
18	Three-minute delay

Page	Section
19	Maintenance
19	Packaging
22	Preventive maintenance
22	Alignment
24	Calibration
24	Power meter
25	Torrmeter
25	Vacuum trigger
25	5 Torr detector

Page	Figure number and description
8-9	How to install an rf power tube
10	Figure 1 - Front panel controls and indicators
11	Figure 2 - Rear panel connectors
13	Figure 3 - PM 112 block diagram
13	Figure 4 - PM 112 schematic of block diagram
15	Figure 5 - Power tube specifications
19	Figure 6 - Bottom partition
20	Figure 7 - Front partition
20	Figure 8 - Rear partition

INTRODUCTION

General Description

The PM 112 rf generator provides the necessary radio frequency power to generate a plasma in Branson/IPC plasma systems. It includes circuits which measure characteristics of the plasma in the reaction chamber, with provisions to drive meters remotely located in the system controller.

The metered quantities are the rf (radio frequency) power level transmitted to the chamber; the reflected power, indicating any impedance mismatch between the chamber impedance and 50-ohms; and the pressure of the gas in the chamber.

The output power level is continuously controlled over the full 1500 watt range by a remote knob. The output level is regulated to withstand normal line voltage variations about 220 volts at either 50 or 60 hertz (internally selectable).

The output frequency is crystal controlled at 13.56 megahertz. The output is designed to drive a 50-ohm load.

The PM 112 also includes provisions for initiating the process cycle. It detects that the reaction chamber has been evacuated to a preset level (approximately 0.1 Torr) and transmits a signal to the controller which then begins the process cycle.

Specifications

- Output Frequency - 13.56MHz $\pm$0.005%, crystal controlled.
- Output Power - 0-1500 watts with continuous control.
- Output - Designed for 50-ohm load.Output Connector - Type UHF.
- Power Monitor - Output dc current is provided to drive an external meter which is calibrated to a full scale reading of 1500 watts. Two separate outputs give the power transmitted to or reflected from the load.

NOTICE

Some systems may be equipped with a PM 112 where in the output power is limited to 750 watts or 1000 watts. In these systems the full scale reading of the meter is 1000 watts.

- Vacuum Monitor - A calibrated dc current is provided to drive a remote meter which is scaled from 0.1 to 20 Torr with a shaded region to indicate atmospheric pressure. The drive signal to the meter is brought in from outside the PM 112, being generated by a vacuum transducer in the treatment console.

- Power Control - A remote rotary control knob continuously varies power from zero to maximum. A remote toggle switch may switch the rf output on or off. A front panel ac line switch turns power to the PM 112 on or off.

- Rear Panel Connections - A permanently attached three-wire power cord is provided at the rear panel. A rear connector provides ac power, metering signals, interlock wires, and control wires to the system programmer. A second connector provides power to and receives the signal from the vacuum transducer. A third connector provides rf output.

- Power Requirements - 208-220VAC, 1 phase, 50-60Hz, 35 amp, maximum, three-wire input.

- Dimensions - Width, 24.25 inches, Height 13.00 inches, Depth 18.26 inches.

- Weight - 95 pounds.

INSTALLATION

Unpacking and handling

The Branson/IPC PM 112 rf generators are thoroughly tested and inspected and then carefully packed before shipment. The unit should be unpacked with the care due any precision instrument. If the package shows that it has been dropped or handled roughly, return it to the carrier unopened.

Remove the packing carton, being careful not to scar or damage the unit. Make a complete visual inspection of the equipment, checking for damage or missing components. Report any damage immediately to your Branson/IPC representative.

Installation

No special installation instructions are required for the PM 112 other than those required if special peripheral equipment is required. Mount it as close as possible to the rf power load and leave clear space at the back of the instrument to allow air flow. The PM 112 is attached to the rf load with the supplied rf power output cable. If the PM 112 is used in a standard Branson/IPC plasma system, vacuum transducer and programmer cables may bee used directly. Their connections will be explained in the manual for the system. Connections to other equipment must be taken up as special cases. Information must be obtained from a Branson/IPC representative or from reference to the schematic. NOTE: A plug and receptacle or positive disconnect box located within view of the generator should be provided for the main ac power cable.

Installing or replacing the power tube

The following assembly instructions are necessary for the proper installation of your power beam tube and thermal isolation parts. Correct assembly of these thermal "protection" parts is essential so as not to transfer exhaust heat from the power tube to the chassis which could damage power components. The metal screw provides ground for any RF energy radiating off of the tube.

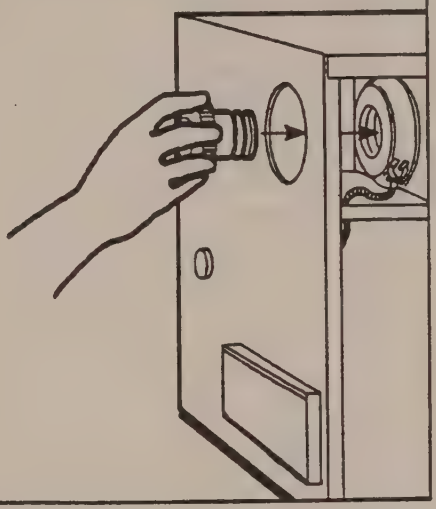
- Unpack the generator and cable box where you will find the power tube and related parts.

Set the generator on its side so that the 4" hole in back of the generator is at the top. Reach in and remove packing material from the rf plate strap/clip. Remove the power tube carefully from its package.

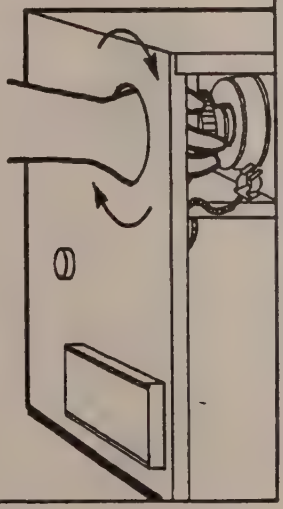
How to install an rf power tube

1 - Power tube.
!DANGER! Shut off the generator and disconnect its power supply before changing the power tube!

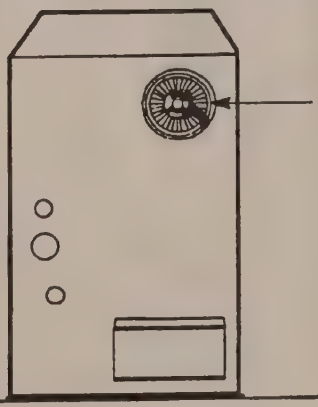
2 - Insert power tube into generator.



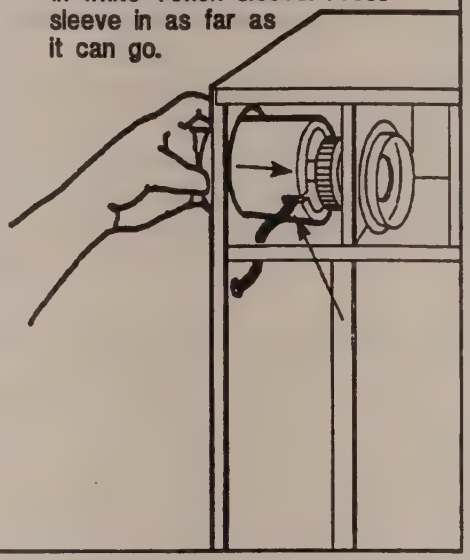
3 - Turn it clockwise until it comes to a stop (about 30°).



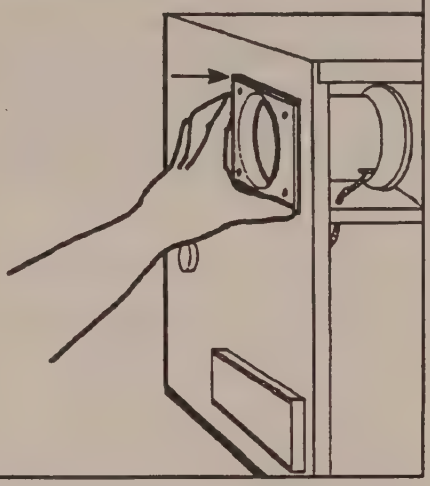
4 - Clip the anode strap to the end of the power tube.



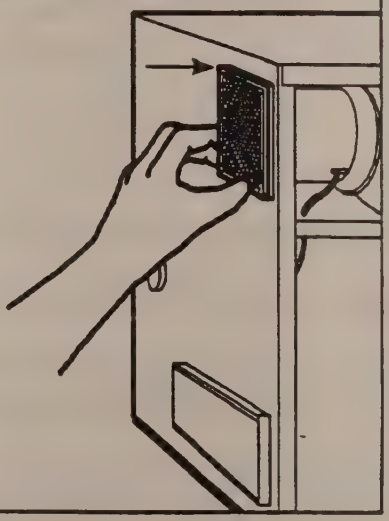
5 - Anode strap threads through slot in white Teflon sleeve. Press sleeve in as far as it can go.



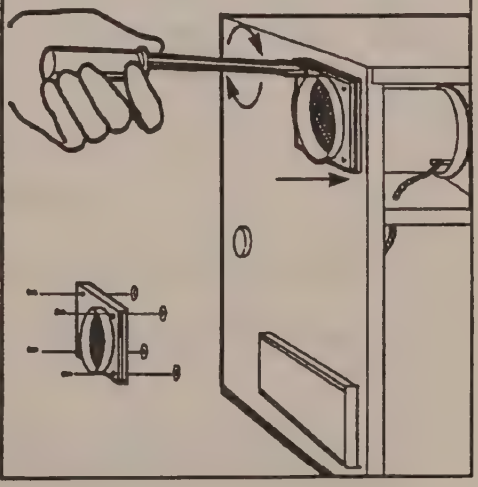
6 - Place the duct baseplate over the duct hole. Align the holes in the plate with the holes in the rf power generator.



7 - Place the duct screen over the duct baseplate. Align the four holes.



8 - Place duct flange over screen & align holes. Secure duct assembly with one metal screw, three nylon screws and four fiber washers.



OPERATION

Controls and Indicators

The operating controls and indicators for the PM 112 are located on the front panel of the reactor center except the ac power switch and indicator lights, which are on the generator front panel. The connectors are on the rear panel. In the text, all operating controls are called out as they appear on the equipment. Front panel controls and rear panel connectors are described below.

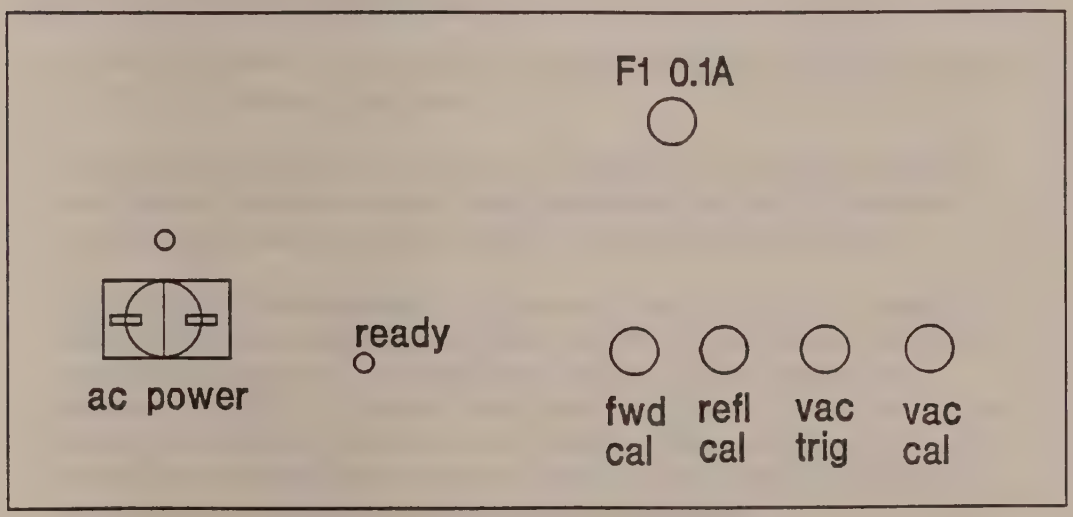


Figure 1. Front panel controls and indicators

- AC POWER ON/OFF switch - Applies AC power to the PM 112.
- AC POWER indicator - The lamp above the AC POWER switch lights when the AC POWER is ON.
- READY indicator - The lamp lights when rf power is available, approximately 3 minutes after the AC POWER has been turned on.

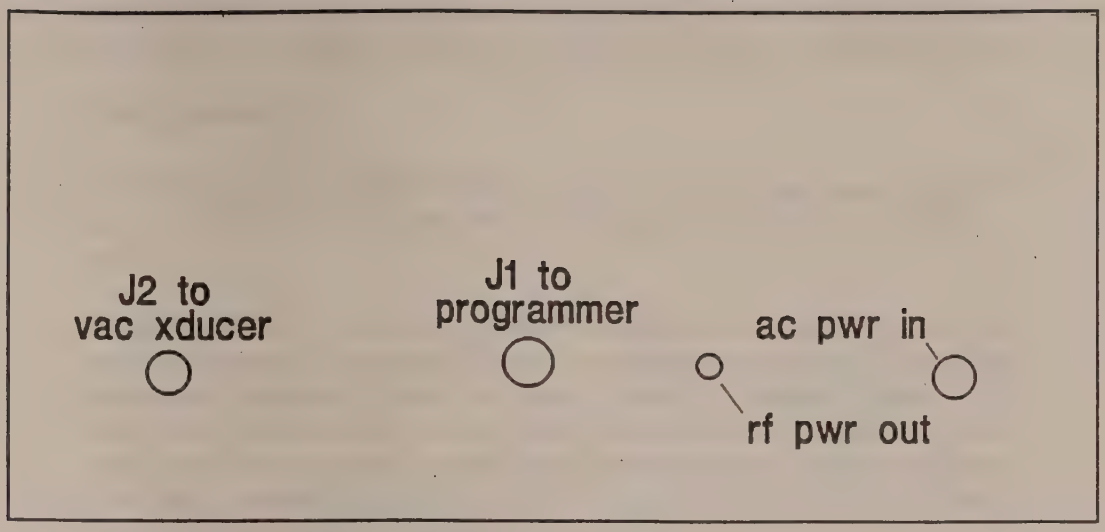


Figure 2. Rear panel connectors

- AC POWER cord - A permanently attached three-wire cord through which the PM 112 obtains its line power.

- VACUUM TRANSDUCER connector - Allows the vacuum transducer which drives the vacuum meter to be attached to the PM112. It supplies power to the transducer and couples the return signal to the meter.

- PROGRAMMER connector - This connects the PM 112 to the external controls which are necessary to operate the PM 112. Isolated ac voltage is sent to the remote unit. A control line to an external potentiometer determines the PM 112 output power level. Three sets of meter leads drive an external vacuum meter and forward and reflected power meter. A power interlock lead may be used to interrupt rf power from the PM 112. An output denoting a preset vacuum level is provided.

- RF POWER OUTPUT connector - Connects PM 112 output power to the load via a UHF type connector.

Operating the generator

Instructions in this section apply to operation of the PM 112 independently as a source of rf power. Operation in complete Branson/IPC plasma systems is described in the manual which applies to that particular machine. Sufficient instructions are included here to operate the PM 112 as a power source to supply energy into a 50-ohm matched load.

Since power from the PM 112 is controlled via the programmer cable, either appropriate auxiliary equipment must be provided which includes the rf control or a special control must be constructed. This may be simply a 100K, 2W potentiometer connected to pins L, J, and K of the PROGRAMMER

jack. Fasten the wiper to pin J and the end of the pot contacted by the wiper in full clockwise rotation to pin K. The other end of the pot connects to pin L.

Operating procedure

- Attach the rf power output cable to the power output connector on the rear panel of the PM 112 and connect a 50-ohm load to the other end of the cable.

- When the PM 112 is used in a complete Branson/IPC plasma system, the programmer cable and vacuum transducer cables are installed. As it is here being used separately, install the special rf control discussed above. No rf power can be obtained without some connection to the programmer jack. Additionally a simulated vacuum transducer connection must be made to the 4 pin transducer jack. This can be a 1 amp 600 volt diode connected between pins A and B, the cathode going to A.

- Set the AC and RF POWER switches to OFF, the RF POWER LEVEL control full counterclockwise, and the FWD/REFL switch to FWD.

- Connect the three-wire power cord into the appropriate power outlet.

Allow the PM 112 to warm up 3 minutes with the AC POWER switch ON before operating any other controls. The RF ready light should then come on. If the PM 112 is used in a complete Branson/IPC plasma system, evacuate the reaction chamber to a pressure of 2 Torr.

- Turn the RF POWER switch to ON. This switch is on the reactor center control panel.

- Raise the RF LEVEL control until the desired rf output is obtained. If the PM 112 is used in a Branson/IPC plasma system, the power may be read on the wattmeter provided in the system. If it is used separately, an external inline wattmeter must be provided between generator and load.

- With the wattmeter reading about 200 watts, change the FWD/REFL switch to REFL. With a matched 50-ohm load, this reading should be very small. If it is large, more than 10-15 watts, then the load must be matched to bring the reflected power down. If the PM 112 is used in a standard Branson/IPC plasma system further instructions on matching will be contained in the manual for that system. If not, other means must be used to adjust the load to a matched condition. When the load is matched, the power may be raised to any value up to maximum.

Check the reflected power by switching the FWD/REFL switch to REFL, to be sure that the load remains matched. Reflected power should be less than 1.0% of the forward power. Power must be reduced if the match is not maintained.

THEORY OF OPERATION

Functional Description

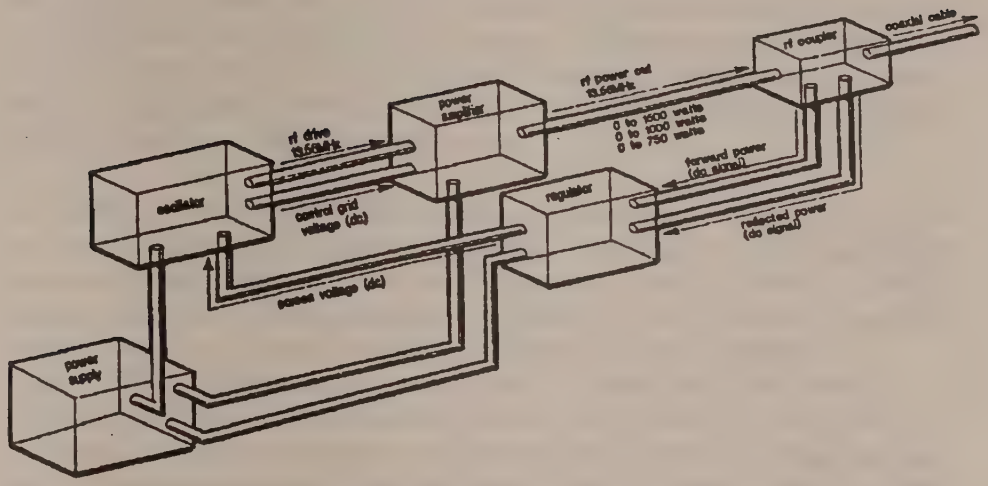


Figure 3. The rf power generator's block diagram.

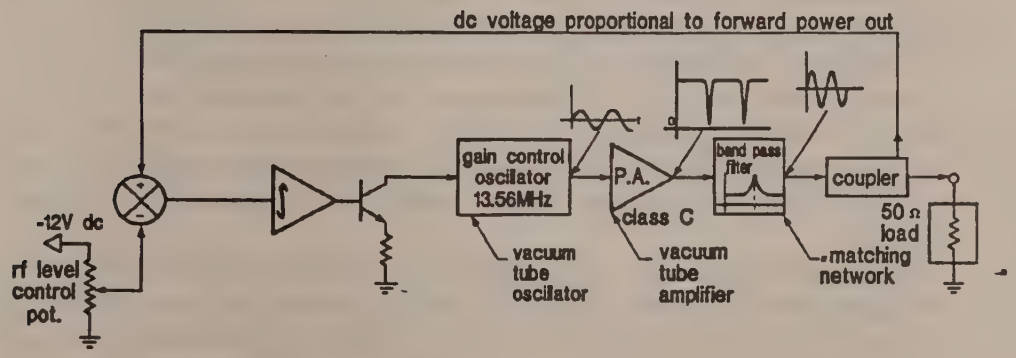


Figure 4. A schematic of the rf power generator's block diagram.

The OSCILLATOR, POWER AMPLIFIER, COUPLER and REGULATOR constitute a feedback control system regulating the output power at a level determined by the rf level control. The OSCILLATOR generates a 13.56MHz sine wave which is amplified by the POWER AMPLIFIER. The amplitude of the OSCILLATOR's output is controlled by the REGULATOR. The COUPLER detects the power supplied by the POWER AMPLIFIER and outputs a dc voltage proportional to the power. This dc voltage is fed to the REGULATOR where it is compare d with the setting of the rf power level control setting.

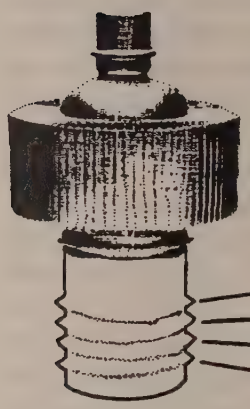
The POWER AMPLIFIER is designed to drive a resistive 50-ohm load, and the reactor center input circuitry is designed to present a 50-ohm load to the generator. This constitutes a "matched" modular system. In order to provide the appropriate 50-ohm impedance each reactor center includes a "matching network" which transforms the impedance of the plasma chamber to 50-ohms. This network must be adjusted to accommodate each set of operating parameters of the reactor chamber, e.g., power, pressure, gas. The adjustment of the matching network is automatic. However, during the time that the matching network is being adjusted, a mismatched condition exists which is a potential hazard to the output stage of the POWER AMPLIFIER. To prevent possible damage to the generator, the COUPLER detects the degree of "mismatch" and provides a dc signal proportional to the mismatch. This signal is referred to as "reflected power", and is fed to the REGULATOR. If the reflected power exceeds a preset limit, the REGULATOR automatically limits the output power to a level that is safe.

The VACUUM CIRCUIT provides the power required by the vacuum sensor in the reactor center, and provides the appropriate interface between the sensor and the vacuum display or meter. The VACUUM TRIGGER detects a preset vacuum level and transmits a signal to the reactor center. The 5 Torr detector circuit disables rf when a pressure greater than 5 Torr is detected in the reaction chamber. Operating the system at greater pressure could result in damage to the reactor center "matching network".

The POWER SUPPLY generates the appropriate dc voltages and ac filament voltage for the vacuum tubes of the oscillator and power amplifier. These are +350VDC, -350VDC, and +3300VDC, and +700VDC, and 6.1VAC. It also supplies +12VDC and -12VDC for the control circuitry.

(Refer to Schematic D04111, Sheets 1 and 2)

Power amplifier (sheet 2)



The Y763 is a ceramic/metal, forced-air cooled, radial-beam tetrode with a rated maximum plate dissipation of 1500 watts. It is a low-voltage, high-current tube specifically designed for exceptionally low intermodulation distortion and low grid interception. The low distortion characteristics make the Y763 especially suitable for radio-frequency and audio-frequency linear amplifier service.

CHARACTERISTICS

Plate Dissipation (Max.)	1500 watts
Screen Dissipation (Max.)	.12 watts
Grid Dissipation (Max.)	1 watt
Frequency for Max. Ratings (CW)	110 MHz
Cooling	Forced Air
Cathode	Oxide-coated Unipotential
Voltage	6.0 volts
Current	10.0 amperes
Capacitances (Gnd. Cath. Connection):	
Input	81.5 pF
Output	11.8 pF
Feed-through	0.02 pF
Transconductance	30,000 μmhos
Base	Special, Breechblock
Recommended Air-System Socket	SK-800B
Recommended Air Chimney	SK-806
Maximum Seal & Anode Core Temperature	250°C
Maximum Length	4.80 in; 121.90 mm
Maximum Diameter	3.37 in; 85.60 mm
Weight (approximate)	27 oz; 0.77 kg
Operating Position	Any

Figure 5. Power tube specifications

The power amplifier utilizes a single vacuum tube tetrode V1, which is connected in a common cathode configuration. Capacitors C6 and C7 with inductors L3 and L4 constitute a two section filter to attenuate rf back to the high voltage power supply. Capacitors C14, C15 and C16 provide ac ground to the screen grid of the power tube. C20 through C26 are rf bypass capacitors for the filament. An rf voltage is fed to the control grid from the oscillator, and the resulting amplified plate signal is coupled to a pi matching network through C13. The rf signal amplitude and superimposed dc bias fed to the grid of the power amplifier bear proper relationship to operate the amplifier class C.

The pi matching network transforms the load impedance, normally 50-ohms, to a higher impedance appropriate for the plate circuit of the tetrode. It is composed of capacitors C8, C9, C10, C11, C19, C23, and C27, with inductor L6. The output of the pi filter is shunted by choke L2, which serves as a bleeder and filter to power supply ripple frequencies. The variable inductor L6 is the means for tuning the plate circuit to the oscillator frequency, while variable capacitor C27 provides means for adjusting the efficiency of the power amplifier class C stage.

Radio-frequency coupler

The rf coupler generates two dc signals. The forward-power signal represents the forward power from the pi network. This is the actual forward power

transmitted through the coaxial cable. The reflected-power signal represents the degree of mismatch between the impedance of the actual load and the desired 50-ohm impedance. Both dc signals go to the regulator circuit.

Oscillator

The oscillator is a single stage tuned plate tuned grid vacuum tube oscillator. The frequency controlling element is a 13.56MHz crystal, X501 in the gird circuit. R501 provides a dc path for the control grid current, as the grid bias is from self rectification. The plate tuned circuit is comprised of inductor/transformer L3 and capacitors C506, C509, C510, and C511. Variable capacitor C506 provides the means for adjusting the frequency of the plate circuit to crystal frequency. L3 also serves as an auto transformer which transforms the impedance of the power amplifier grid circuit to the higher impedance appropriate for the plate of the oscillator tube. R508 and C507 comprise an attentuator and phase shift network completing the feedback loop for the oscillator. C505 provides ac ground for the plate circuit. R502 with bypass capacitor C501 provides a means for monitoring the oscillator tube current at TP3 through an isolation resistor R503. The 700 volt plate supply is fed to the plate through L501. L501 and C508 filter the rf to the supply. The amplitude of the oscillator output is determined by the positive dc voltage on the screen grid of the oscillator tube. This control voltage is supplied to the oscillator at terminal E503 by the regulator. The resistors R507, R504, R701, R9, R702, and R703 along with transistor Q703 are elements of a voltage divider which provide a resistive load and positive supply to the regulator output transistors. This network also serves to offset the regulator control voltage to bias the power amplifier tube control grid. (The emitter current, hence the collector voltage, of Q703 is determined by the regulator control voltage.) Transistor Q501 buffers the offset control voltage and supplies it to the power amplifier tube control grid through L3. An important feature of the voltage divider network is that saturation of Q703 prevents the power amplifier bias from going too far in the positive direction, thereby protecting the tube. Capacitor C505 is an rf bypass for the power amplifier bias voltage. Capacitors C502 and C503 are rf bypass capacitors for the oscillator screen.

RF regulator

The REGULATOR performs two functions. It monitors the power level through the coupler and controls its level according to the setting of the remote RF LEVEL control. It also monitors the "reflected power" from the COUPLER, and if it exceeds a preset level the REGULATOR automatically limits the drive to the POWER AMPLIFIER to a safe level.

Referring again to the schematic, the power level controller consists of operational amplifier A201, buffer transistor Q201, and associated circuitry. The dc signal from the COUPLER is fed through LC filter L201 and C201. This filtered voltage drives the wattmeter through R203. Rheostat R12 serves

to calibrate the meter for "forward power". R205 provides a load for the coupler output in the absence of a meter.

The dc gain of the control loop is provided in two parts: the integrated amplifier A201 which has a gain in the order of 10^6; and the amplifier comprised of transistor Q201 and resistors R211 and R213, with a gain of 22. The entire amplifier is made an integrator with feedback capacitor C207 and input resistors R201, R220, R217, and R12. The reference voltage for the amplifier is signal ground through R207. Operationally the regulator output provides a positive voltage to the oscillator grid causing an rf signal through the coupler such that the positive polarity "forward power" signal exactly balances the negative voltage set up by the remote RF LEVEL control.

Capacitors C203, C211, and C209 insure dynamic stability for the feedback amplifier. The output of the integrated amplifier is prevented from going more negative than -5 volts by a clamping network comprised of CR204, CR201, and R209.

The amplifier comprised of integrated amplifier A201 and Q206, with their associated circuitry, perform the identical function as described above, except that it deals with the "reflected power" from the coupler. Its output is combined with the output of the forward power amplifier so that either can limit the rf power output.

If the magnitude of the "reflected power", a positive voltage, exceeds the magnitude of the negative voltage, set by R218, the amplifier shuts down the oscillator by decreasing the oscillator screen voltage.

Vacuum circuit

The vacuum transducer, which is located in the reactor center remote to the generator, is a thermocouple type. It requires a power source to power its heaters and a meter to display the voltage of its thermocouple. The power source is located in the generator.

The transducer power source is the vacuum circuit oscillator comprised of integrated circuit amplifier A401 and associated components, R401, R402, R403, C402, and C403. The oscillator generates a square wave at approximately one kilohertz. The amplitude of the square wave is adjusted with R13 and coupled to the transducer through transformer T401. The transducer's thermocouple is then applied to the remote meter.

Vacuum trigger

Some plasma systems controllers require the detection of a preset vacuum level. In the PM 112 this level is preset by R10. The signal is detected by the dc amplifier comprised of integrated circuit amplifier A401, transistor Q401, and their associated circuitry.

The voltage of the transducer thermocouple is applied to one input terminal of the amplifier and the voltage determined by R5 to the other. If the voltage of the thermocouple exceeds the potentiometer voltage, indicating that the chamber pressure is below the preset level, transistor Q401 is turned off. The voltage divider of the R10 and R407 with the +250 volt supply provide the appropriate drive for the relay located in the reactor controller.

5 Torr detector circuit

If the PM 112 is used with a complete Branson/IPC plasma system, the 5 Torr detector circuit inhibits rf when reactor chamber pressure is greater than 5 Torr. Otherwise excessively high voltages occur in the reactor center "matching network" which could damage the network. The vacuum level signal is detected by the dc amplifier comprised of the integrated circuit amplifier A402, transistor Q402, and their associated circuitry. The voltage of the vacuum transducer thermocouple is applied to one input terminal of the amplifier, and the voltage determined by R414 to the other. If the voltage of the thermocouple is less than the potentiometer voltage, Q402 is turned ON. The screen grid of V101, the oscillator tube, is then shunted to ground and rf is inhibited.

Three-minute delay

When circuit breaker CB1 is switched on, power is applied to the 12 volt power supplies and to the filament transformer. The 120 volts is not applied to the high-voltage regulator however, until K1 (a three-minute time delay relay) has timed out. It may take several seconds for the regulator to stabilize after K1 times out, so the circuit which includes A301b disables triac pulses for a short time.

Just before K1 times out, A301b pin 7 is at some negative voltage and A301b output at pin 10 is positive. CR310 and CR311 are forward-biased so that C303 is discharged and C308 is charged to +12 volts. In this state the voltage at A302a pin 2 will never cross zero and no triac firing pulses will be generated.

C302 charges when K1's contacts close and 120 volts is applied to the anode of CR316. A301b output switches negative shortly after so that CR310 is reverse-biased. C303 and C308 then discharge through CR311 and current source Q303. In this state, A302a pin 2 can cross zero volts in the negative direction and triac trigger pulses are generated.

MAINTENANCE

Packaging

The PM 112 is partitioned into three parts as follows:

- A bottom partition, which becomes accessible upon removal of the bottom cover.
- A front partition, which becomes accessible upon removal of the hood and front portion of the top cover.
- A rear partition, which becomes accessible upon removal of the hood and rear portion of the top cover.

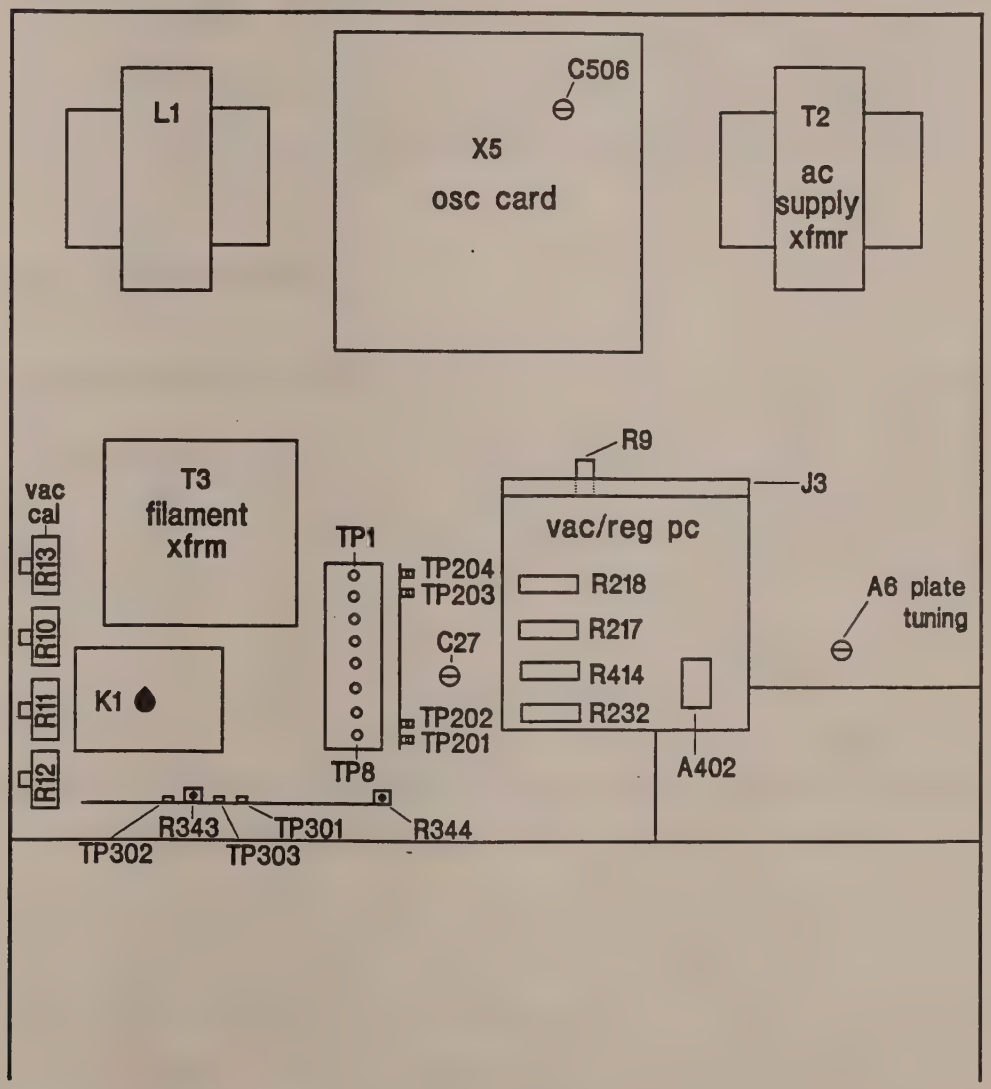


Figure 6. Bottom partition.

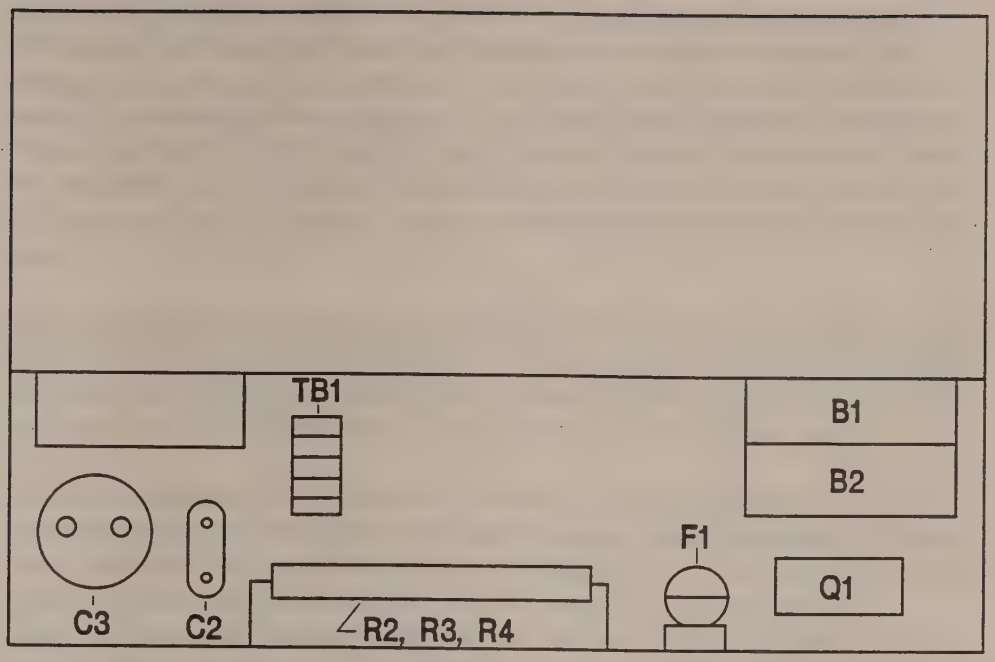


Figure 7. Front partition.

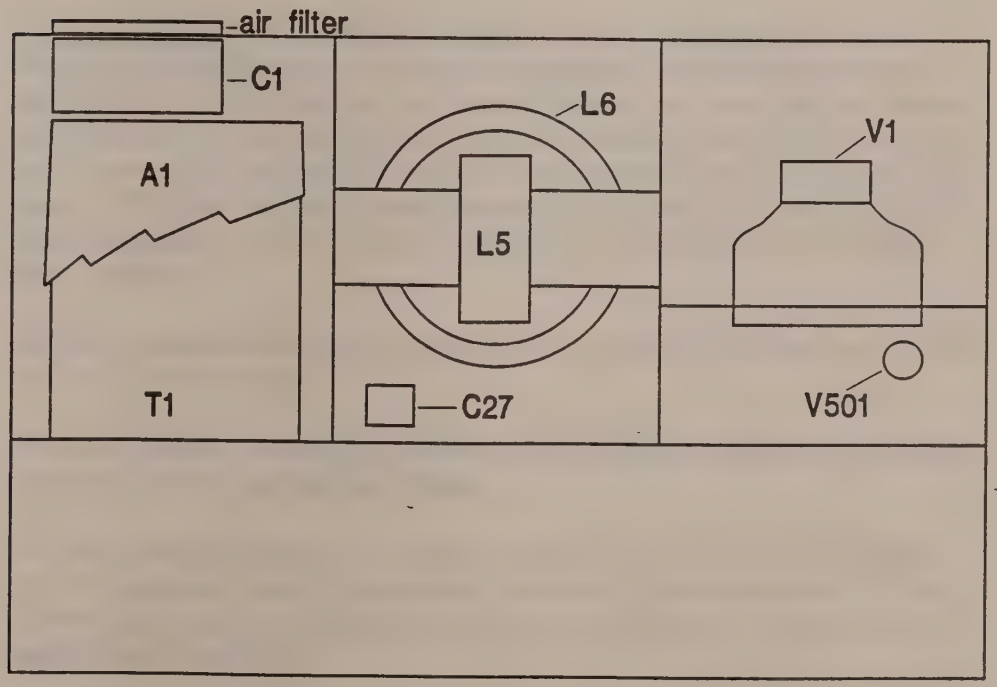


Figure 8. Rear partition.

All those adjustable components involved in alignment of the generator are included in the lower partition. Each adjustable component is accessible through an access hole in the front or rear panel, or by removing the bottom cover. The lower partition includes five circuit boards. The first contains the circuitry of the RF OSCILLATOR and is bolted directly to the chassis. All of the oscillator parts, except the vacuum tube, are mounted on the bottom side of the circuit board. The vacuum tube is accessible by removing the top rear cover.

The second circuit board is a plug-in board which includes the circuitry of the REGULATOR, and VACUUM CIRCUIT, and the VACUUM TRIGGER. Adjustments on this circuit board include the FORWARD POWER LIMIT and the REFLECTED POWER LIMIT, and the 5 Torr trigger point.

The third board, the grid bias control assembly, is not a plug-in board. It is mounted beside the oscillator board, and it includes the transistor Q703 and several resistors of the control signal, voltage divider, circuit. Also it includes a differential amplifier comprising of Q701 and Q702 and associated resistors. This amplifier receives its input from the "5 Torr" trigger circuit of the rf regulator and vacuum board assembly. The output signal of the amplifier is applied to the rear panel connector J1 at pin F where it is routed to external equipment for actuating a remote dc relay. The remote relay disables gas flow when chamber pressure exceeds 5 Torr. This "5 Torr" trigger point is adjustable within limits.

The fourth printed circuit board is a plug-in board, which includes the circuits of the high voltage regulator and the vacuum tube filament supply regulator. There are three test points mounted on the board. As one observes the card edge with the test points (with the component side of the board up) the left most test point is TP-1, the center test point is TP-2, and the third test point is TP-3. The left most potentiometer adjustment, R343, adjusts the high voltage supplies. The right most potentiometer, R344, adjusts the filament supply voltage.

The fifth printed circuit board is a plug-in board, which includes the + 12 volt and the -12 volt supplies.

The front partition houses the several power resistors, the power supply filter capacitor C1, and the front panel parts.

The rear partition includes the circuitry for the RF POWER AMPLIFIER and the voltage supplies. The rectifier diodes with filter capacitors C103 and C104 are packaged on a circuit board which is mounted on top of the power supply transformer T1.

All connectors for mating with other system components are located on the rear panel.

Preventive Maintenance

The most obvious requirement for preventive maintenance is cleansing the air filter mounted on the rear panel. It is aluminum mesh and can be cleaned with ordinary solvents. If it is not cleaned, restricted air flow could result in damage to the power amplifier tube.

The cooling fan requires no lubrication.

- Remove the generator outer cover.
- Loosen the air filter bracket screws.
- Slide the filters up and out of the brackets.
- Clean with warm, soapy water and blow dry with compressed air.

Alignment

As stated previously, all adjustable components are accessible through the front and rear panels, or by removing the bottom partition, it is most convenient to set the generator on the side nearest the ac power ON/OFF switch.

As discussed in the Operation section, the PM 112 is controlled via the PROGRAMMER cable. Consequently, the controls necessary to perform the following adjustments must be provided in the manner indicated in that section. The PM 112 may either bee installed in a Branson/IPC plasma system which includes the necessary control circuits, or a special control must be provided. A test point bracket is included in the generator bottom partition to facilitate alignment. Make certain the ac power switch is OFF and the AC POWER cord disconnected. Remove the bottom cover. Make the following initial adjustments:

- Bias level (R9) - mid position
- Oscillator tuning capacitor (C506) - mid position
- Plate tuning capacitor (C27) - mid position
- Plate coil (L6) - fully out, then in three complete turns
- Forward limit (R217) - full clockwise
- Reflected limit (R218) - full clockwise
- High voltage adjustment (R343) - full counterclockwise

- Turn the RF POWER LEVEL control to its minimum (fully counterclockwise) position.

- Set the RF POWER ON/OFF switch to its OFF position.

- Insert an inline wattmeter with a 1500 watt element between the generator rf output connector and a 50-ohm dummy load. The dummy load should be rated for a continuous drive of 1500 watts or more.

- An oscilloscope should be connected to the generator output. A coax tee can be inserted in the rf output cable to gain access to the output signal.

- Plug in the ac power cord.

- Turn the ac power switch ON.

Wait approximately three minutes at which time the READY light will turn on.

- Set the RF POWER ON/OFF switch to its ON position.

- Set R344 on the high voltage regulator board for 6.1 volts true RMS at the 6.3 volt ac terminals on the oscillator board.

NOTICE

The correct voltage is 6.1 volts true RMS, an ordinary VOM or DMM cannot be used.

- With a high voltage probe and dc voltmeter, measure the high voltage on the large filter capacitor C5 just inside the air intake screen. Adjust R343 for a reading of 3300 volts.

- With a dc voltmeter (10 volt range) observe the oscillator current signal between TP3 and TP8 and slowly turn the RF LEVEL control clockwise for a voltage of 4.0 to 5.0 volts. (Level control will be sensitive since the circuit is operating open loop without feedback from the rf coupler.)

- Adjust the oscillator plate tuning capacitor, C506, for a minimum voltage at TP3. Return the POWER LEVEL control to its minimum position. Turn OFF the RF ON/OFF switch.

- Connect a dc voltmeter between TP4 and TP8. The voltage to be measured here represents thee power amplifier plate current. Turn on the RF ON/OFF switch. Adjust the POWER LEVEL control for about 500 watts at the output. Observe the voltage will be negative with respect to TP8.

- Increase the setting of the POWER LEVEL for an output power level of 1500 watts.

- Observe the voltage on TP4. Adjust L6 for a minimum. Adjust C27 so that the screen current between TP1(+) and TP2(-) is approximately 0 volts at 1500 watts output. Set R9 for 3.6 volts at TP3.

As there is some interaction between the above adjustments, readjust C506, L6, C27, and R9 until the following test point voltages are observed:

TP3(+) to TP8(-) . . . 3.6 volts

TP4(-) to TP8(+) . . . 0.75 to 0.80 volts

TP1(+) to TP2(-) . . . 0 volts

Calibration

Power meter

NOTICE

Do not perform calibration unless the Alignment section has been

Calibration of the system power meter requires a reference inline wattmeter and 1500 watt element.

- Insert the reference meter between the generator and the reactor center. Place the FWD/REFL switch in its FWD position, the RF LEVEL OFF and the AC POWER ON. Adjust the mechanical zero of the front panel power meter to read zero.

- Turn the FWD LIMIT (located on the rf regulator plug-in board) potentiometer to its extreme counterclockwise position. With the POWER LEVEL control completely counterclockwise turn the POWER LEVEL switch ON.

- Slowly advance the POWER LEVEL control to extreme clockwise position. The output power should remain at zero. Adjust the FWD LIMIT potentiometer until the reference meter reads 1500 watts.

- Turn the POWER LEVEL control counterclockwise until the reference meters reads 1500 watts. Adjust R12 FWD CAL, so that the front panel meter also reads 1500 watts.

- Adjust the RF LEVEL control for zero (θ) watts and turn the rf OFF. Disconnect the rf cable from the generator output connector. Turn the REFL LIMIT potentiometer to its extreme counterclockwise position.

- Turn the RF LEVEL on, and turn the LEVEL control slowly to its maximum clockwise position. The RF output should remain at zero (θ). Adjust the REFL LIMIT potentiometer until the meter reads 150 watts. Put the FWD/REFL switch to its REFL position. Adjust the REFL CAL potentiometer until the meter reads 150 watts on the "reflected power" scale.

Torrmeter

The torrmeter adjustment is one which must be made in conjunction with the vacuum transducer which is to be used with the torrmeter. The transducer is normally located remotely in a unit external to the generator. In addition to the system transducer, another reference transducer/meter combination is needed on the same vacuum system. There also must be a means for adjusting the vacuum in the system.

If these conditions can be met, set the system pressure (utilizing air) to 0.2 Torr according to the reference torrmeter/transducer. Adjust the VAC CAL R13 potentiometer so that the front panel meter also reads 0.2 Torr. Set the system pressure to 2.0 Torr according to the reference torrmeter/transducer. Adjust the mechanical adjustment on the front panel meter so that it also reads 2.0 Torr. Repeat the process until no further adjustments are necessary.

Vacuum trigger

To set the VAC level, set the system pressure to 0.2 Torr and observe the voltage at pin 7 of J3. J3 is the rf regulator printed circuit board connector. The voltage will be either zero volts or approximately + 125 volts. Set the VAC TRIG R10 adjustment so that this voltage just changes from its zero to its positive level. Allow the system pressure to rise above 0.5 Torr (or until the voltage returns to its zero level). Reduce the pressure and verify that the voltage returns to its positive level at 0.2 Torr. Readjust VAC TRIG as necessary.

5 Torr detector

To set the 5 Torr level, set the system pressure to 5.0 Torr and observe A402 pin 12 of the regulator PC board. The voltage will be either a + 12VDC or -12VDC. Reduce the pressure and verify that the voltage switches to -12VDC.

DWG. NO.	REV.
D 03394	C

DIONEX GAS PLASMA SYSTEMS

ENGINEERING PARTS LIST

REV	DESCRIPTION	DATE	CHK	APPR
C	E.O. #10855 AR	3/80		

REVISION LEVEL

DIONEX GAS PLASMA DIVISION

31159 SAN BENITO
HAYWARD, CALIF. 94544

DRAWN	DATE	TITLE
JV	5/18/78	A 1 HV RECTIFIER BOARD PM 112
CHECKED	DATE	
ENG.	DATE	

	DRAWING NO.	REV.
D	03394	C

NEXT ASSY.

DO NOT SCALE THIS DRAWING

A05495 REV A

ENGINEERING PARTS LIST

REF. NO.	DESCRIPTION	PART NO.	QTY.
C101-104	CAPACITOR, ELECT 20 μF 450 V	1500-0226	4
C105	CAPACITOR, ELECT. 100 μF 450 V	1500-0227	1
E101-111	TERMINAL HH SMITH #2008	2860-2008	11
R101-107	RESISTOR, 330K ±5% 2 W., CARBON COMP	4705-0334	7
R109-112	RESISTOR, 47K, 2 W. CARBON COMP	4705-0473	4
R108	RESISTOR, WIREWOUND 1Ω ±5% 5 W.	4706-0010	1
CR101-140	DIODE - MOTOROLA MR 510	4800-0008	40
1	P.C. BOARD BLANK	C 03392	1
REF	ELECTRICAL SCHEMATIC SHT 1 & 2	D 04111	1

DIONEX
GAS PLASMA DIVISION
31159 SAN BENITO
HAYWARD, CALIF.
94544

TITLE
A 1 - HV RECTIFIER
PM 112 GENERATOR

SIZE	DWG. NO.	REV.	CHK.	APPR.
D	03394	C		

DRAWN	DATE	SHEET 2 OF 2
JV	5/18/78	

A 04288 REV

ENGINEERING PARTS LIST 0

REF. NO.	DESCRIPTION	PART NO.	QTY.
1	HEAT SINK	B 03925	1
2	HEAT SINK	B04343	1
C201	CAPACITOR 1μF 100V	1500-0049	1
	SPRAGUE 225 P10591YD3		
C202,203	CAPACITOR ELECT 1000μF 50V	1500-0225	2
	SPRAGUE TVA-1316		
C204,205	CAPACITOR .1μF 20V	1500-0026	2
	CENTRALAB VIC 20-104		
R201	RESISTOR	4702-0103	1
	10K 1/4W CARBON COMP		
R202,	METAL FILM RESIS.	4602-2262	2
203	226Ω 2% 1/4W		
R204	RESISTOR	4706-0121	1
	120Ω 5W CARBON COMP.		
R205	POTENTIOMETER	4750-0013	1
	BOURNS #3069P-1-103		
R206	POTENTIOMETER	4750-0969	1
	BOURNS # 3069P-1-502		
R207,	RESISTOR	4702-0100	2
208	10Ω 1/4W CARBON COMP.		

INTERNATIONAL PLASMA CORPORATION
31159 SAN BENITO
HAYWARD, CALIF.
94544

TITLE: AZ-12V PWR SUPPLY BD PM 112

SIZE	DRAWING NO.	REV.	APPR.
B.	03399	C	PG

DRAWN	DATE	SHEET 2 OF 3
JV	5-18-78	

ENGINEERING PARTS LIST 0

REF. NO.	DESCRIPTION	PART NO.	QTY.
CR201	DIODE BRIDGE	4800-0044	1
	INT'L RECT. 18DB2A		
CR202,	DIODE	4800-0013	2
203	MOTOROLA IN4007		
Q201,	VOLTAGE REGULATOR	4800-0140	2
202	NATIONAL LM 317		
TP201	TEST POINT	2000-0004	4
-204	E.F. JOHNSON 105-750-001		
3	PC BOARD BLANK	03397	1
REF	ELECTRICAL SCHEMATIC	D 04111	1
	SHT. 1 & 2		
4	BHMS 4-40 x 3/16		4
5	#4 FIBER WASHER		8
6	#4 KEP NUT		4

INTERNATIONAL PLASMA CORPORATION
31159 SAN BENITO
HAYWARD, CALIF.
94544

TITLE: A2- 12V PWR SUPPLY BD. PM 112

SIZE	DRAWING NO.	REV.	APPR.
B	03399	C	PCL

DRAWN	DATE	SHEET
JV	5-18-78	3 OF 3

DIONEX GAS PLASMA SYSTEMS

ENGINEERING PARTS LIST

DWG. NO.	REV.
C 03409	L

REV	DESCRIPTION	DATE	CHK	APPR
M	E.O. 10913	10/25/80		P&S
L	E.A.R. #20416	9-8-80		P&S
G	REVISION E.O. #10722	3-17-80		P&S
F	REVISION	12/79		
E	REVSION			
D	REVISION			
C	REVISION			
B	REVISION			
A	RELEASE J.V.	5/78		

REVISION LEVEL

DIONEX GAS PLASMA DIVISION

31159 SAN BENITO
HAYWARD, CALIF. 94544

DRAWN	DATE	TITLE
J.V.	5-18-78	A3 H.V. REGULATOR BOARD PM 112 R.F. GENERATOR
CHECKED	DATE	
ENG.	DATE	

	DRAWING NO.	REV.
C	03409	M

DO NOT SCALE THIS DRAWING

NEXT ASSY. E 04015

A05495 REV A

ENGINEERING PARTS LIST

REF. NO.	DESCRIPTION	PART NO.	QTY.
T301	TRANSFORMER	B 03337	1
1	P C BLANK BOARD	B 03407A	1
C304,C312	CAPACITOR, .18 μF 250 V -SIEMENS B32-541-0	1500-0006	2
C313	(USED ON 50 Hz SYSTEMS ONLY)	1500-0006	1
C302,303	CAPACITOR .1 μF 400 VDC	1500-0025	2
	SPRAGUE 4PS-P10		
C306-307	CAPACITOR .001 μF 1 KVDC	1500-0032	2
	SPRAGUE 5GA-D10		
C309-311	CAPACITOR, .1 μF, 50 V	1500-0047	3
	CENTRALAB UK10-474		
C301	CAPACITOR 1.0 μF 100 VDC	1500-0049	1
	SPRAGUE 225P		
C308	CAPACITOR .47 μF 200 V	1500-0211	1
	SPRAGUE 2PS-P47		
C305	CAPACITOR .047 μF 100 VDC	1500-0261	1
TP301-303	TEST POINT	2000-0004	3
2	14 PIN IC SOCKET	2110-0001	3
	AMPHENOL 821-20011-144		
W1	JUMPER, GOLD	2120-0401	1
	BERG #65474-101		

DIONEX
GAS PLASMA DIVISION
31159 SAN BENITO
HAYWARD, CALIF.
94544

TITLE
A-3 HV REGULATOR BOARD
PM 112 GENERATOR

SIZE	DWG. NO.	REV.	CHK.	APPR.
C	03409	M		

DRAWN	DATE	SHEET 2 OF 5
JV	5/18/78	

A 04289 REV

ENGINEERING PARTS LIST

REF. NO.	DESCRIPTION	PART NO.	QTY.
3	BERGSTIK, GOLD	2120-0402	1
	BERG #65500-103		
R325,326 351,352	RESISTOR, METAL FILM 20 K 1% 1/4 W.	4602-0203	4
R317-319	RESISTOR, METAL FILM, 100K 1/4 W. 1%	4602-0104	3
R310	RESISTOR, METAL FILM, 75K 1/4 W ± 1%	4602-0753	1
R339	RESISTOR, METAL FILM, 7.87K 1% 1/4 W	4602-0782	1
R324	RESISTOR, METAL FILM 205K 1% 1/4 W	4602-2055	1
R330	RESISTOR, METAL FILM, 2.26 MEG 1% 1/4 W	4602-2266	1
R312	RESISTOR, METAL FILM, 39.2K 1/4 W 1%	4602-3924	1
R311	RESISTOR, METAL FILM 57.6K, 1/4 W 1%	4602-5764	1
R348	RESISTOR, CARBON COMP 200 Ω 1/4 W.	4702-0201	1
R346	RESISTOR, CARBON COMP 100 Ω 1/4 W	4702-0101	1
R304-307 R334	RESISTOR, CARBON COMP 1K 1/4 W	4702-0102	5
R301-303	RESISTOR, CARBON COMP 10K 1/4 W	4702-0103	3
R320-323	RESISTOR, CARBON COMP 100K 1/4 W	4702-0104	4
R333	RESISTOR, CARBON COMP 1 MEG 1/4 W	4702-0105	1
R327	RESISTOR, CARBON COMP 10 MEG 1/4 W	4702-0106	1
R308,309	RESISTOR, CARBON COMP 120K 1/4 W	4702-0124	2
R316,329	RESISTOR, CARBON COMP 2K 1/4 W	4702-0202	2
R337	RESISTOR, CARBON COMP 220K 1/4 W	4702-0224	1
R332	RESISTOR, CARBON COMP 2.2 MEG 1/4 W	4702-0225	1
R345	RESISTOR, CARBON COMP 27K 1/4 W	4702-0273	1
R340	RESISTOR, CARBON COMP 36 Ω 1/4 W	4702-0360	1
R315	RESISTOR, CARBON COMP 470 Ω 1/4 W	4702-0471	1

DIONEX
GAS PLASMA DIVISION
31159 SAN BENITO
HAYWARD, CALIF.
94544

TITLE
A-3 HV REGULATOR BOARD
PM 112 GENERATOR

SIZE	DWG. NO.	REV.	CHK.	APPR.
C	03409	M		

DRAWN	DATE	SHEET 3 OF 5
JV	5/18/78	

ENGINEERING PARTS LIST

REF. NO.	DESCRIPTION	PART NO.	QTY.
R328	RESISTOR, CARBON COMP 4.7K 1/4 W	4702-0472	1
R314,335, R336,338	RESISTOR, CARBON COMP, 47K 1/4 W.	4702-0473	4
R313	RESISTOR, CARBON COMP. 470K 1/4 W.	4702-0474	1
R349	RESISTOR, CARBON COMP. 560Ω 1/4 W. 5%	4702-0561	1
R342	RESISTOR, CARBON COMP 6.8K 1/4 W	4702-0682	1
R331	RESISTOR, CARBON COMP. 750K 1/4 W.	4702-0754	1
R350	RESISTOR, CARBON COMP. 8.2K 1/4 W., 5%	4702-0822	1
R341	RESISTOR, CARBON COMP. 200Ω 1 W.	4704-0201	1
			2
R347	RESISTOR, CARBON COMP. 1K 2W	4705-0102	1
R344	POTENTIOMETER 50 K	4750-0012	1
	BOURNS 3069P-1-503		
R343	POTENTIOMETER, 50 Ω	4750-0500	1
	BOURNS 3069P-1-500		
Q303,304 Q306	TRANSISTOR	4800-0002	3
	MOTOROLA MPS 6530		
A301-303	OPERATIONAL AMPLIFIER	4800-0012	3
	FAIRCHILD MA747		
CR301,302 CR316,317	DIODE	4800-0013	4
	MOTOROLA IN 4007		
CR304-315	DIODE, MOTOROLA #IN4151	4800-0045	12
Q305	TRANSISTOR	4800-0046	1
	MOTOROLA 2N 4918		
Q301	TRANSISTOR	4800-0047	1
	MOTOROLA 2N 4921		

DIONEX
GAS PLASMA DIVISION
31159 SAN BENITO
HAYWARD, CALIF.
94544

TITLE
A-3 HV REGULATOR BOARD
PM 112 GENERATOR

SIZE	DWG. NO.	REV.	CHK.	APPR.
C	03409	M		

DRAWN	DATE	SHEET 4 OF 5
J.V.	5/18/78	

ENGINEERING PARTS LIST

REF. NO.	DESCRIPTION	PART NO.	QTY.
0302	TRIAC	4800-0102	1
	HUTSON 1T48		
REF	SCHEMATIC	E 06550	REF

DIONEX
GAS PLASMA DIVISION
31159 SAN BENITO
HAYWARD, CALIF.
94544

TITLE				
A-3 HV REGULATOR BOARD PM 112				
SIZE	DWG. NO.	REV.	CHK.	APPR.
C	03409	1		
DRAWN	DATE	SHEET 5 OF 5		
J.V.	5/18/78			

A 04289 REV

DIONEX GAS PLASMA SYSTEMS

ENGINEERING PARTS LIST

DWG. NO.	REV.
C 03448	G

REV	DESCRIPTION	DATE	CHK	APPR
G	E.O. #10852 AR	3/80		

REVISION LEVEL

DIONEX GAS PLASMA DIVISION

31159 SAN BENITO
HAYWARD, CALIF. 94544

DRAWN JV	DATE 5/18/78	TITLE A-5 OSCILLATOR BOARD ASSEMBLY PM 112 GENERATOR	
CHECKED	DATE 5/23/80		
ENG.	DATE	C	DRAWING NO. 03448 REV. G
		DO NOT SCALE THIS DRAWING	

NEXT ASSY. E 04015

ENGINEERING PARTS LIST

REF. NO.	DESCRIPTION	PART NO.	QTY.
3	P. C. BOARD BLANK	C 03446	1
T501	OSCILLATOR TRANSFORMER	B 04162	1
5	HEAT SINK	B 05263	1
C505	CAPACITOR .01 μF 1K V	1500-0003	1
	SPRAGUE 5GA-S10		
C502,503	CAPACITOR, .001 μF	1500-0032	2
	SPRAGUE 5GA-D10		
C504,508 C509	CAPACITOR, 1000 pF 6 KV	1500-0034	3
	CENTRALAB DD 60-102		
C501	CAPACITOR, 2200 μF	1500-0212	1
	SPRAGUE 5GA-D22		
C510,511	CAPACITOR, 8.2 pF 1 KV	1500-0222	2
	SPRAGUE 5GA-V82		
C507	CAPACITOR, 200 pF 500 V	1500-0223	1
	ARCO/ELMENCO CM05FD201 J03		
C506	CAPACITOR, AIR VARIABLE	1550-0002	1
	JFD #VC54G		
L501	INDUCTOR	1800-0253	1
	MILLER 4632		
1	SOCKET CRYSTAL	2110-0254	1
	AUGAT 8000-D-G1		

DIONEX
GAS PLASMA DIVISION
31159 SAN BENITO
HAYWARD, CALIF.
94544

TITLE: A5- OSCILLATOR BOARD ASSEMBLY
PM 112 GENERATOR

SIZE	DWG. NO.	REV.	CHK.	APPR.
C	03448	G	RLS	

DRAWN	DATE	SHEET 2 OF 3
J.V.	5/18/78	

ENGINEERING PARTS LIST

REF. NO.	DESCRIPTION	PART NO.	QTY.
4	SOCKET, TUBE, 9 PIN	2110-0306	1
	SAE #5-9388		
X501	CRYSTAL, QUARTZ 13.56 M Hz	2300-0111	1
E501-513	TERMINALS, STAKE-ON	2860-2008	13
	H. H. SMITH 2008		
R503	RESISTOR, 1K, 1/4 W. CAR COMP	4702-0102	1
R501	RESISTOR, 100K, 1/4 W. CAR COMP	4702-0104	1
R502	RESISTOR, 150Ω2 W. CAR COMP	4705-0151	1
R508,509	RESISTOR, 2.2K 2 W. CAR FILM	4705-0222	2
R504	RESISTOR, 39K, 2 W. CAR FILM	4705-0393	1
R507,510	RESISTOR, 10K, 5W CAR FILM	4706-0103	2
Q501	TRANSISTOR	4800-0024	1
	MOTOROLA 2N5657		
V501	OSCILLATOR TUBE	5700-0112	REF ONLY
	RCA 6JT6A		

DIONEX
GAS PLASMA DIVISION
31159 SAN BENITO
HAYWARD, CALIF.
94544

TITLE: A-5 OSCILLATOR BOARD ASSEMBLY
PM 112 GENERATOR

SIZE	DWG. NO.	REV.	CHK.	APPR.
C	03448	G		

DRAWN	DATE	SHEET 3 OF 3
JV	6/12/78	

A 04289 REV

ENGINEERING PARTS LIST O

REF. NO.	DESCRIPTION	PART NO.	QTY.
1	RF COUPLER BODY	D 03377	1
2	RF " PARTITION	B 03376	1
3	RF CONDUCTOR	B 03364	1
4	RF CONDUCTOR INSULATOR	B 03365	1
5	RF " INSULATOR	B 03790	1
6	SOLDER TERM. RING CONNECTOR		3
	12-10 VACO # 11408		
7	#6 LOCKING TERMINAL LUG		2
	H H SMITH 1416-6		
8	BHMS 6-32 x 1/4		4
9	NYLON RHMS		2
	6-32 x 1/2		
10	#18 BUSS WIRE		AIR
11	#12 BUSS WIRE		AIR
12	#8 x 1/4 NYLON SPACER	2860-4008	2
	HHSMITH 4008		
13	3/8 SOLDER LUG		1
	HH SMITH 1497		
14	BRASS BHMS		1
	6-32 x 1/4		

INTERNATIONAL PLASMA CORPORATION
31159 SAN BENITO
HAYWARD, CALIF.

TITLE: A4 RF COUPLER ASS'Y PM 112

SIZE	DRAWING NO.	REV.	APPR.
D	03810	D	PCD

DRAWN | DATE | SHEET 2 OF 2

ENGINEERING PARTS LIST

REF. NO.	DESCRIPTION	PART NO.	QTY.
C401,	CAPACITOR 1000 μF FEED THRU	1500-0205	2
402	ERIE 327-005-X5U0-102M		
R401	POT 750 Ω	4750-0002	1
	ALLEN BRADLY # JAIL 040S751UC		1
R402	RESISTOR	4704-0151	
	150 Ω 1W CAR. COMP		
CR401	DIODE	4800-0045	2
402	MOTOROLA 1N4151		
J401	CONNECTOR UHF	2180-0190	1
	AMPHENOL 83-798		
REF	ELECTRICAL SCHEMATIC	D 04111	1
	SHT 1 & 2		

INTERNATIONAL PLASMA CORPORATION
31159 SAN BENITO
HAYWARD, CALIF.

TITLE: A4 RF COUPLER ASS'Y
PM 112

SIZE	DRAWING NO.	REV.	APPR.
D	03810	D	P.D

DRAWN | DATE

DIONEX GAS PLASMA SYSTEMS

ENGINEERING PARTS LIST

DWG. NO.	REV.
04015	Q

REV	DESCRIPTION		DATE	CHK	APPR
R	E.O. 10899	PHD	9-23-80		
Q	E.A.R.#20260		9-8-80		PCD
P	E.A.R. #20415		8-28-80		PCD
O	E.O. #10872	MS	4-25-80		
N	E.O. #10655, 10870	MS	4-1-80		
M	E.O. 10705	PB	3/80		
L	E.O. 10792	KG	1/80		
K	E.O. 10761		1/80		
J	E.O. #10721	K.G.	11/79		

REVISION LEVEL

DIONEX GAS PLASMA DIVISION
31159 SAN BENITO
HAYWARD, CALIF. 94544

DRAWN	DATE	TITLE
K. GUINN	11/13/79	PM 112 GENERATOR TOP ASSEMBLY
CHECKED	DATE	
ENG.	DATE	

E04015 NEXT ASSY.

	DRAWING NO.	REV.
E	04015	Q

DO NOT SCALE THIS DRAWING

ENGINEERING PARTS LIST

REF. NO.	DESCRIPTION	PART NO.	QTY.
1	POWER TUBE SUPPORT BRK'T	C 02943	1
2	TEFLON INSULATOR GEN.	B 02946	1
3	RF SCREEN BRK'T	B 02959	1
4	RF GENERATOR SKIDS	B 03057	3
5	HV BD MT'G BRK'T	B 03076	4
6	NEUTRALIZING CAP PART	B 03078	1
	INSULATOR		
7	OUTPUT COIL ADJ. SCREW	B 03085	1
8	OUTPUT COIL TIE STRAP	B 03111	1
9	RF TANK PARTITION & FAN	D 03355	1
	BRK'T		
10	FRONT PANEL BRK'T LEFT	C 03356	1
	SIDE		
11	BEZEL BAR	B 03358	2
12	ADJ POT MT'G BRK'T	B 03359	1
13	FLEXIBLE RF ANODE STRAP	B 03361	1
14	RF OUTPUT PLATE	B 02363	1
15	TOP COVER REAR SECTION	C 03360	1
16	BOTTOM COVER	C 03363	1
17	RIGHT SIDE COVER	C 03367	1
18	RF WINDOW PARTITION	C 03370	1
19	COIL SUPPORT BAR FIXED	B 03373	1
20	CONNECTOR BRK'T REG BD	C 03375	1
21	FRONT PANEL	D 03379	1
22	MAIN CHASSIS	D 03381	1

INTERNATIONAL PLASMA CORPORATION
31159 SAN BENITO
HAYWARD, CALIF.
94544

TITLE: PM112 GENERATOR TOP ASS'Y

SIZE	DRAWING NO.	REV.	APPR.
E	04015	R	[illegible]

DRAWN	DATE	SHEET 4 OF 13
[illegible]	5/15/73	

ENGINEERING PARTS LIST

REF. NO.	DESCRIPTION	PART NO.	QTY.
23	HV REGULATOR BRK'T	B 03476	1
24	12V SUPPLY BRK'T	C 03477	1
25	CONNECTOR BRK'T 12V	B 03900	1
	SUPPLY		
28	EXHAUST AIR FLANGE	C 03978	1
29	TOP COVER FRONT SECTION	C 03947	1
30	VARIABLE CAP. STRAP	B 04151	1
31	PLATE CAP. BRK'T	B 04276	1
32	SIDE COVER LEFT	C 04277	1
33	TEFLON EXHAUST TUBE	B 04149	1
34	NEUTRALIZING CAP. PART	B 04302	1
	ADJ STRAP		
35	PM 112 GEN. FRONT PANEL	B 04304	1
	BRK'T RIGHT SIDE		
36	PM 112 GEN. FLEXIBLE	B 04308	2
	RF STRAP		
37	COIL SUPPORT BAR SPACER	B04535	1
38	EXHAUST SCREEN	B 04148	1
39	EXHAUST SCREEN RETAINER	B04538	1
40	REAR PANEL	D 04270	1
41	FRONT PANEL DECAL	D 03967	1
42	INTAKE SCREEN	B 03056	1
43	COIL SUPPORT BAR LOWER	B 03367	1

INTERNATIONAL PLASMA CORPORATION
31159 SAN BENITO
HAYWARD, CALIF.
94544

TITLE: PM 112 GEN TOP ASS'Y

SIZE	DRAWING NO.	REV.	APPR.
E	04015	R	KAW

DRAWN	DATE	SHEET
[illegible]	5/10-78	SHEET 5 OF 13

ENGINEERING PARTS LIST

REF. NO.	DESCRIPTION	PART NO.	QTY.
C1	CAPACITOR 8μF 4KV	1500-0178	1
	PLASTIC CAP LK40-805		
C2	CAPACITOR 4μF 440 V	1500-0241	1
	MALLORY DP-440		
C3	CAPACITOR 300μF TO 480μF	1500-0037	1
	450V MALLORY CGS-481-DF1		
C6,7,13,	CAPACITOR 1000 PF CRAMIC	1500-0191	4
19	TRAMSMITTING CENTRALAB		
	858S-1000		
C9,10	CAPACITOR 50 pF 7.5KV	1500-0192	2
	CENTRALAB 850S-50Z		
C8,23	CAPACITOR 25 pF	1500-0194	2
	CENTRALAB 850S-25Z		
C12	CAPACITOR .47μF 600V	1500-0228	1
	SPRAGUE 6PS-P47		
C14-16	CAPACITOR .001μF 1KV	1500-0032	3
	SPRAGUE 5GA-D10		
C11, 19	CAPACITOR 100pF 500V	1500-0189	2
	CENTRALAB 850S-100N		
C20-22	CAPACITOR .01μF 500V CERAMIC	1500-0001	11
C24-26 C30-34	DISC - SPRAGUE 5GAS-S10		
C27	CAPACITOR 99-718 DUAL AIR	1550-0209	1
	CARDWELL 167-53		

INTERNATIONAL PLASMA CORPORATION
31159 SAN BENITO
HAYWARD, CALIF.
94544

TITLE: PM 112 GEN TOP ASSEMBLY

SIZE	DRAWING NO.	REV.	APPR.
E	04015	R	KJM

DRAWN	DATE	SHEET 6 OF 13
JV	5-16-78	

ENGINEERING PARTS LIST

REF. NO.	DESCRIPTION	PART NO.	QTY.
L3, 4, 7	RF CHOKE	1800-0006	3
	MILLER #4612	71247-01	
L5	INDUCTOR AIR DUX #1212A	1800-0100	1
L2	RF CHOKE	1800-0253	1
	MILLER #4632		
TP1-8	TEST POINT	2000-0152	8
	SELECTRO SKT-0804		
44	CARD GUIDE	2100-0191	2
	UNITRACK HS-2500-38-4		
45	CONNECTOR 22 PIN	2100-0223	2
	VECTOR R644		
46	CONNECTOR 18 PIN	2100-0002	1
	AMPHENOL 225-21821-101		
47	TUBE SOCKET 8 PIN	2110-0170	1
	CINCH JONES 8 AM		
48	TUBE SOCKET	2110-0200	1
	EIMAC SK-800B		
49	TUBE CHIMNEY	2110-0201	1
	EIMAC SK-806		
J1	CONNECTOR	2152-2216	1
	AMPHENOL MS-3102A-22-19S		
J2	CONNECTOR	2152-2417	1
	AMPHENOL MS-3102A-14S-2S		
50	TERMINAL STANDOFF	2100-0207	4
	USECO 1417-0		

INTERNATIONAL PLASMA CORPORATION
31159 SAN BENITO
HAYWARD, CALIF.
94544

TITLE: PM 112 GEN TOP ASSEMBLY

SIZE	DRAWING NO.	REV.	APPR.
E	04015	R	

DRAWN	DATE	SHEET 7 OF 13
JV	5-16-72	

ENGINEERING PARTS LIST

REF. NO.	DESCRIPTION	PART NO.	QTY.
TB1	TERMINAL STRIP	2170-0223	1
	CINCH JONES 5-141		
51	MARKER STRIP	2170-0224	1
	CINCH JONES MS-5-141		
B1, 2	FAN, ETRI	2600-0010	2
53	FURNITURE LEVELLER	2800-0005	6
	FRANKLIN 6242 SILENT GLIDE		
54	CABLE CLAMP 1" ID	2800-0240	1
55	CAPACITOR MT'G RING	1525-0002	1
	2" ID VAP MT'G RING		
56	CAPACITOR BRK'T	1525-0242	1
	CORNELL DUBILIER 32107-1		
DS1	LAMP AMBER 115V	3900-0001	1
	DIALCO 507-4537-1433-640		
DS2	LAMP RED 115V	3900-0002	1
	DIALCO 507-1431-640		
57	LAMP HOLDER	3900-0107	2
	DIALCO 250-7545-14-504		

INTERNATIONAL PLASMA CORPORATION
31159 SAN BENITO
HAYWARD, CALIF.
94544

TITLE: PM 112 GEN. TOP ASSEMBLY

SIZE	DRAWING NO.	REV.	APPR.
E	04015	R	KD

DRAWN	DATE	SHEET	OF
JV	5-16-73	8	13

ENGINEERING PARTS LIST

REF. NO.	DESCRIPTION	PART NO.	QTY.
K1	RELAY	4500-0159	1
	POTTER BRUMFIELD CHB-38-70003		
R1	RESISTOR	4702-0101	1
	100 Ω 1/4W 5% CAR. COMP.		
R2,3	RESISTOR 3000 Ω 100W	4750-0231	2
	OHMITE 2215		
R4	RESISTOR 750 Ω 100W	4750-0232	1
	OHMITE 2210		
R5,15	RESISTOR 500 Ω 12W	4712-0501	2
	OHMITE 1730		
R6	RESISTOR	4703-0272	1
	2.7K 1/2W 5% CAR. COMP		
R7,8	RESISTOR	4705-0222	2
	2.2K 2W 5% CAR. COMP.		
R9	RESISTOR 100K	4750-0001	1
	OHMITE CMU-1041		
R10-12	RESISTOR 750 Ω	4750-0002	3
	A&B JAIL04057IUC		
R13	RESISTOR 2.5K 2W POT.	4750-0968	1
	OHMITE CLU-2521		
R14	RESISTOR 50K 11W	4711-0503	1
	OHMITE 4873		
58	RESISTOR MT'G BRACKET.	4760-0001	4
	OHMITE 5B		

INTERNATIONAL PLASMA CORPORATION
31159 SAN BENITO
HAYWARD, CALIF.
94544

TITLE: PM 112 GEN. TOP ASSM'Y

SIZE	DRAWING NO.	REV.	APPR.
E	04015	R	VAM

DRAWN	DATE	SHEET 9 OF 13
JJ	8-16-72	

ENGINEERING PARTS LIST

REF. NO.	DESCRIPTION	PART NO.	QTY.
Q1	TRIAC ASSEMBLY	B06200	1
S1	CIRCUIT BREAKER	5100-0151	1
	ITE BQ2B040		
F1	FUSE 3AG 250V 0.1A	5150-0312	1
	LITTLEFUSE 312.100		
59	FUSE CLIP	5150-2210	1
	LITTLEFUSE 129002		
60	FUSE HOLDER	5150-2516	1
F6	IR FUSE 250V 35A	5150-2535	1
T4	TRANSFORMER	5600-0005	1
	TRIAD N68X	5150-2535	1
T3	TRANSFORMER	5600-0016	1
	STANCOR P6308		
T1	HIGH VOLTAGE TRANSFORMER	C 03339C	1
T2	POWER TRANSFORMER	C 03340C	1
L1	INDUCTOR HIGH VOLTAGE	C 03256B	1
L6	INDUCTOR TANK COIL	C 03371A	1
V2	ELECTRON TUBE PWR BEAM	5700-0187	1
	EIMAC 4CX1500B		

INTERNATIONAL PLASMA CORPORATION
31159 SAN BENITO
HAYWARD, CALIF.
94544

TITLE: PM 112 GEN TOP ASS'Y

SIZE	DRAWING NO.	REV.	APPR.
E	04015	R	KJH

DRAWN	DATE	SHEET
JV	5-16-78	10 OF 13

ENGINEERING PARTS LIST

REF. NO.	DESCRIPTION	PART NO.	QTY.
61	INSULATED NYLON COUPLER	2120-5077	5
	HOLLINGWORTH SO-5077		
	18-22 GA (F)		
62	INSULATED NYLON COUPLER	2120-5078	7
	HOLLINGWORTH SO-5078		
	18-22 GA (M)		
63	INSULATED NYLON COUPLER	2120-5076	4
	HOLLINGWORTH SO-5076 (M)		
64	INSULATED NYLON COUPLER	2120-5075	4
	HOLLINGWORTH SO-5075 (F)		
65	#6 LOCKING TERMINAL LUG		
	H H SMITH 1416-6		
66	SOLDERLESS TERM. RING CONN		
	VACO 11410 12-10 GA WIRE		
67	RF I SHIELD	C04776	1
68	TB COVER	C04718	1
70	H.H. SMITH #8202 STANDOFF	2860-8202	2
72	FACE MTG BRACKET	C04889	1
	ITE FB9555		
73	INSULATOR CONE	3100-0185	1
	135-0500-001		
74	"L" BRACKET GRID BIAS BD	B04415	2

INTERNATIONAL PLASMA CORPORATION
31159 SAN BENITO
HAYWARD, CALIF.
94544

TITLE: PM 112 GEN TOP ASSY

SIZE	DRAWING NO.	REV.	APPR.
E	04015	R	KDM

DRAWN	DATE	SHEET 11 OF 13
JV	5-16-78	

ENGINEERING PARTS LIST

EF. NO.	DESCRIPTION	PART NO.	QTY.
A1	HV RECTIFIER/ FILTER BD. ASS'Y	C03394B	1
A2	12V POWER SUPPLY BD. ASS'Y	C03399C	1
A3	HIGH VOLTAGE REGULATOR ASS'Y	C03409	1
A4	RF COUPLER	D03810C	1
A6	RF REGULATOR + TORRMETER	C04365	1
	BD ASS'Y		
69	HOUSING ASS'Y	D03969A	1
A7	GRID BIAS CONTROL BD ASS'Y	A04380A	1
75	Insulator Fuse Holder	B06521	1
76	Fuse Mounting Bracket	B06522	1
28	CAPACITOR 1000 PF	1500-0034	1
	CERIMAC TRANSMITTING		
	CENTRALAB # DD60-102		
	LABELS, for PM 112	6100-0005	1
	LABELS, for PM 112	6100-0010	1

INTERNATIONAL PLASMA CORPORATION
31159 SAN BENITO
HAYWARD, CALIF.
94544

TITLE: PM 112 GEN TOP ASS'Y

SIZE	DRAWING NO.	REV.	APPR.
E	04015	R	KAM

DRAWN	DATE	SHEET
JV	5-16-78	12 OF 13

ENGINEERING PARTS LIST

REF. NO.	DESCRIPTION	PART NO.	QTY.
REF	ELECTRICAL SCHEMATIC	D 04111	
	SHT 1 & 2		
REF	"A" HARNESS	D 04284	
	HIGH VOLTAGE		
REF	"B" HARNESS	D 04285	
	LOW CURRENT		
REF	TEST PROCEDURE- PM112	A00113	

INTERNATIONAL PLASMA CORPORATION
31159 SAN BENITO
HAYWARD, CALIF.
94544

TITLE: PM 112 GEN. TOP ASS'Y

SIZE	DRAWING NO.	REV.	APPR.
E	04015	R	KAM

DRAWN	DATE	SHEET
LV	4-19-78	13 OF 13

DWG. NO.	REV.
B 06200	A

DIONEX GAS PLASMA SYSTEMS

ENGINEERING PARTS LIST

REV	DESCRIPTION	DATE	CHK	APPR
A	INITIAL ISSUE E.O. #10792	1/80		

REVISION LEVEL

DIONEX GAS PLASMA DIVISION
31159 SAN BENITO
HAYWARD, CALIF. 94544

DRAWN K. GUINN,	DATE 1/ 9/80	TITLE TRIAC ASSEMBLY PM 112 GENERATOR	
CHECKED	DATE 1-14-80		
ENG.	DATE	B	DRAWING NO. 06200 REV. A
		DO NOT SCALE THIS DRAWING	

NEXT ASSY. E 04015

ENGINEERING PARTS LIST

REF. NO.	DESCRIPTION	PART NO.	QTY.
1	MOUNTING BRACKET	B 06198	1
2	HEAT SINK	B 06199	1
3	STAND OFF	2860-2607	2
4	TRIAC	4800-0101	1
5	FLAT HEAD SCREW #8-32 x .375 LONG		4

DIONEX
GAS PLASMA DIVISION
31159 SAN BENITO
HAYWARD, CALIF.
94544

TITLE
TRIAC ASSEMBLY
PM 112 GENERATOR

SIZE	DWG. NO.	REV.	CHK.	APPR.
B	06200	A		

DRAWN	DATE	SHEET 2 OF 2
K.GUINN	1/9/80	

DIONEX GAS PLASMA SYSTEMS

ENGINEERING PARTS LIST

DWG. NO.	REV
C 06514	A

REV	DESCRIPTION	DATE	CHK	APPR
A	E.O. #10852	5-20-80		

REVISION LEVEL

DIONEX GAS PLASMA DIVISION
31159 SAN BENITO
HAYWARD, CALIF. 94544

DRAWN	DATE	TITLE
D. YEH	5-20-80	PM 112 RF GENERATOR REGULATOR & VACUUM BOARD ASSY
CHECKED	DATE	
	5/20/80	
ENG.	DATE	DRAWING NO. / REV.
	5-21-80	C 06514 A

NEXT ASSY.

DO NOT SCALE THIS DRAWING

ENGINEERING PARTS LIST

REF. NO.	DESCRIPTION	PART NO.	QTY.
3	HEATSINK	B 04485	4
2	REGULATOR BOARD	C 06512	1
	SCHEMATIC	E 06550	REF
C 406	CAPACITOR, CERAMIC DISC, .01uF 500V	1500-0001	1
	SPRAGUE #5GAS-S10		
C 214,405 C 409,410	CAPACITOR, 22uF 16V	1500-0011	5
C 411			
C 404,407	CAPACITOR, CERAMIC DISK, .1uF 25V	1500-0026	2
	CENTRALAB #UK 20-104		
C 205,206 C 213,401	CAPACITOR, CERAMIC DISC, .001uF 1000V	1500-0032	5
C 408	SPRAGUE #5GA-D10		
C 201,202 C 211,212	CAPACITOR, MICA 100pf	1500-0117	4
	ARCO/ELMENCO #DM 15 - ED 101J03		
C 402,403	CAPACITOR, .05uF 500V	1500-0210	2
	SPRAGUE #5 HK-S50		
C 207,208	CAPACITOR, 47pF 1000V	1500-0217	2
	SPRAGUE #5GA-Q47		
C 203,204 C 209,210	CAPACITOR, CERAMIC DISK 10pF 1000V	1500-0218	4
	SPRAGUE #5GA-Q10		
C 231	CAPACITOR, .1uF 50V	1500-0047	1
L 201,202 L 401,402	CHOKE, 39uH	1800-0012	6
L 403,404	MILLER #9210-56		

DIONEX
GAS PLASMA DIVISION
31159 SAN BENITO
HAYWARD, CALIF.
94544

TITLE: PM 112 RF GENERATOR
REGULATOR & VACUUM BOARD ASSY

SIZE	DWG. NO.	REV.	CHK.	APPR.
C	06514	A		

DRAWN	DATE	SHEET 2 OF 4
D. YEH	5-20-80	

A 04289 REV

ENGINEERING PARTS LIST

REF. NO.	DESCRIPTION	PART NO.	QTY.
1	IC SOCKET 14 PIN	2110-0001	3
	AMPHENOL #821-20011-144		
4	BERGSTIK, GOLD	2120-0401	1
	BERG #65500-103		
W1, W2	JUMPER, GOLD	2120-0402	1
	BERG #65474-101		
R 209,210	RESISTOR, METAL FILM 5.1K ¼W	4602-0053	2
R 233,234	RESISTOR, 442K ¼W	4602-4423	2
R 215,216 R 413	RESISTOR, CARBON 100ohm ¼W	4702-0101	3
R 205,206 R 410	RESISTOR, CARBON 1K ¼W	4702-0102	3
R 211,212 R 238,401	RESISTOR, CARBON 10K ¼W	4702-0103	5
R 403			
R 235,237	RESISTOR, 1M ¼W	4702-0105	2
R 222	RESISTOR, CARBON 10 Meg ¼W	4702-0106	1
R 204	RESISTOR, CARBON 1.5K ¼W	4702-0512	1
R 219,220 R 221	RESISTOR, CARBON 22K ¼W	4702-0223	3
R 213,214	RESISTOR, CARBON 220K ¼W	4702-0224	2
R 201,202 R 207,208	RESISTOR, CARBON 27K ¼W	4702-0273	4
R 406,412	RESISTOR, CARBON 3.3K ¼W	4702-0332	2
R 404,415	RESISTOR, CARBON 390K ¼W	4702-0395	2
R 405,411 R 416,236	RESISTOR, CARBON 4.7K ¼W	4702-0472	4
R 408,409	RESISTOR, CARBON 680 ohm ¼W	4702-0681	2
R 203	RESISTOR, CARBON 6.8K ¼W	4702-0682	1

DIONEX
GAS PLASMA DIVISION
31159 SAN BENITO
HAYWARD, CALIF.
94544

TITLE
PM 112 RF GENERATOR
REGULATOR & VACUUM BOARD ASSY

SIZE	DWG. NO.	REV.	CHK.	APPR.
C	06514	A		

DRAWN	DATE	SHEET 3 OF 4
D. YEH	5-20-80	

ENGINEERING PARTS LIST 0

REF. NO.	DESCRIPTION	PART NO.	QTY.
R 218	POTENTIOMETER, 50K	4750-0012	1
	BOURNS #3069P-1-503		
R 232	POTENTIOMETER, 10K	4750-0013	1
	BOURNS #3069-1-103		
R 414	POTENTIOMETER, 1K	4750-0021	1
	BOURNS #3069P-1-102		
R 217	POTENTIOMETER, 100K	4750-0022	1
	BOURNS #3069P-1-104		
A 201,401 A 402	OPERATIONAL AMPLIFIER	4800-0012	3
	FAIRCHILD #MA 747		
Q 201,202 Q 401,402	TRANSISTOR	4800-0024	4
	MOTOROLA #2N 5657		
CR203, CR417	DIODE	4800-0045	2
	MOTOROLA #IN 4151		
CR201,202	DIODE, ZENER	4800-0051	2
	MOTOROLA #IN 5231		
T 401	AUDIO TRANSFORMER	5600-0014	1
	ESSEX #TA-45		

DIONEX
GAS PLASMA DIVISION
31159 SAN BENITO
HAYWARD, CALIF.
94544

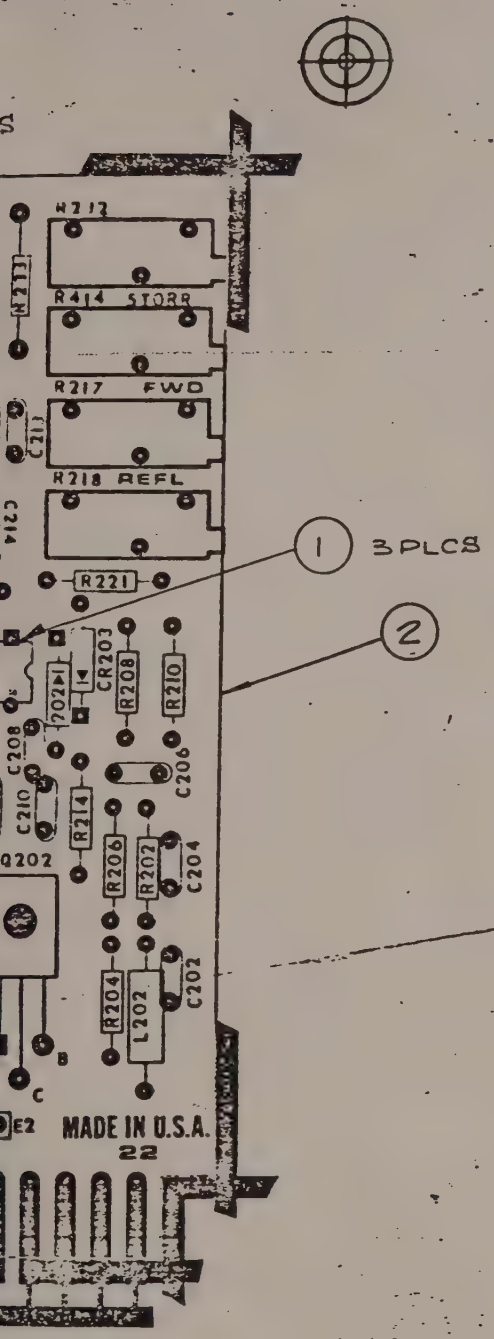
TITLE
PM 112 RF GENERATOR
REGULATOR AND VACUUM BOARD ASSY

SIZE	DWG. NO.	REV.	CHK.	APPR.
C	06514	A	R.V.S.	

DRAWN	DATE	SHEET 4 OF 4
D. YEH	5-20-80	

A 04289 REV

3
4PL
RED
T402
PART NO
C06512 A
GRN
BLK
BLU
WHT
R236
R230
R235
R239
R237
R412
R413
Q402
C231
A402
C409
C407
C408
R411
L404
R220
R219
A201
R402
R401
C403
L403
C402
R403
R409
R222
R209
R207
R204
201
C205
C207
C211
C209
R211
R212
C404
R405
C405
A401
R404
R410
C203
R201
R205
R213
Q201
C410
Q401
R406
R416
417
C401
C201
L401
L201
R203
R215
R216
L402
C411
CR241
R240
R408
C406
-12V
+12V
1



REV	DESCRIPTION	DATE	CHK	APPD
C	E.O # 11681 KL	4-21-81	DH	
B	E.O. # 11010 EA	3-81		
A	E.O # 11652			

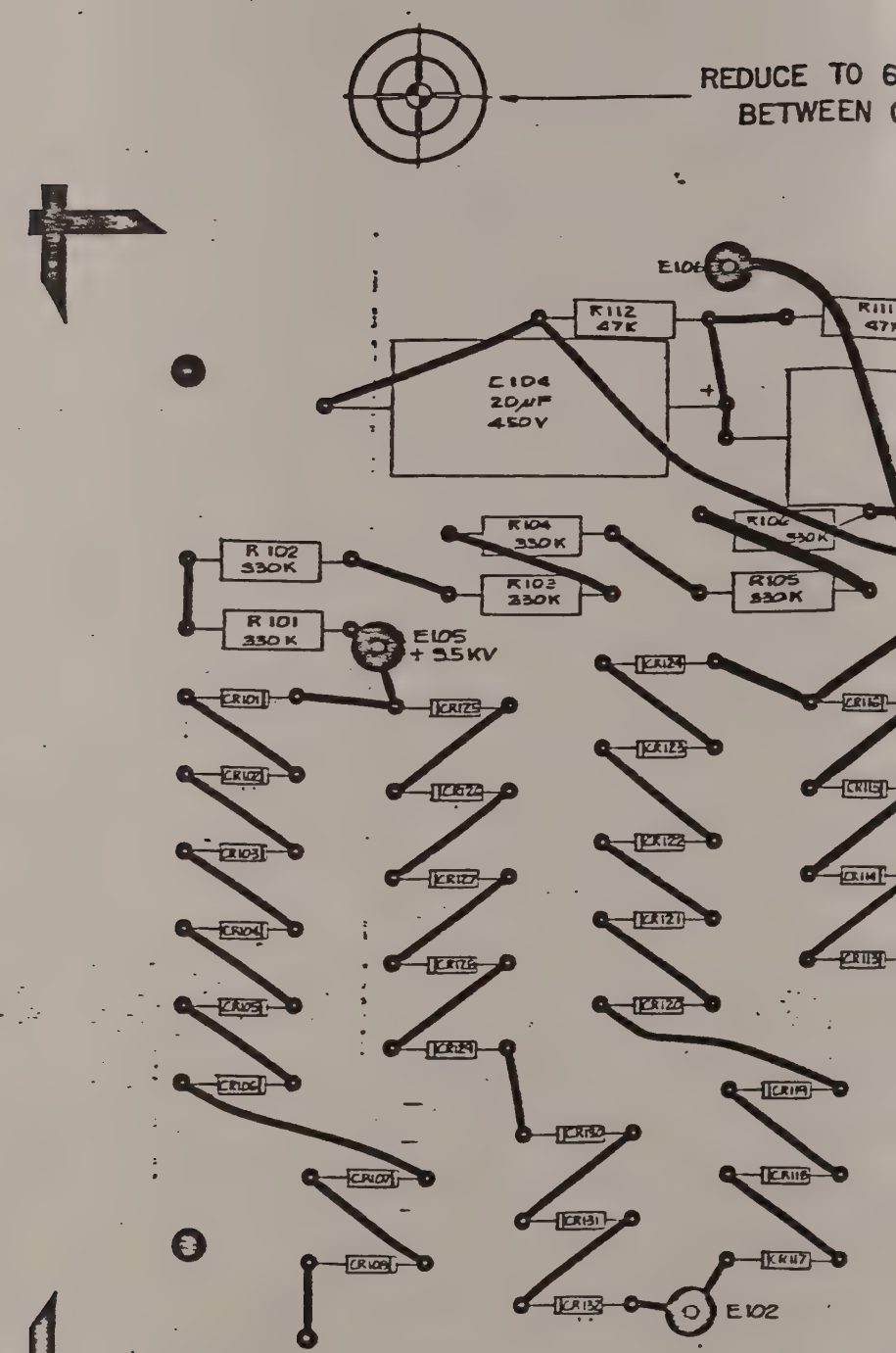
REVISION LEVEL

DIONEX GAS PLASMA DIVISION

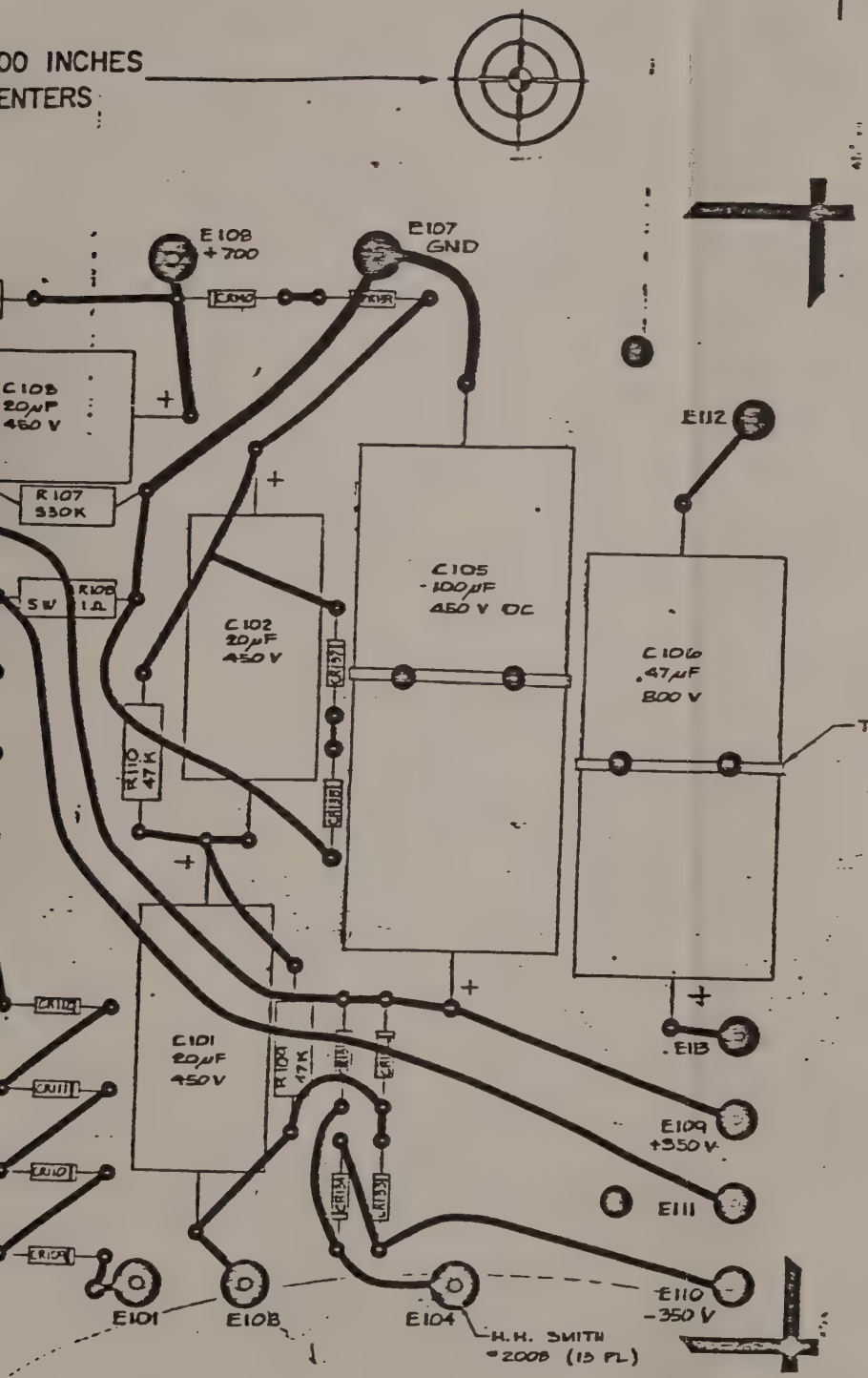
31133 SAN BENITO
HAYWARD, CALIF. 94544

E0-1015 NEXT ASSY

DRAWN	DATE	TITLE ASSEMBLY DRAWING REGULATOR, VACUUM BOARD FM 112, GENERATOR
CHECKED	DATE	
ENG	DATE	C DRAWING NO. 06514 REV. C
SCALE 2/1	DO NOT SCALE THIS DRAWING	SHEET 1 OF 4


REDUCE TO 6
BETWEEN
E106
R112
47K
C104
20μF
450V
+
R104
330K
R102
330K
R103
330K
R101
330K
E105
+ 35KV
R105
330K
CR101
CR102
CR103
CR104
CR105
CR106
CR107
CR108
CR125
CR126
CR127
CR128
CR129
CR130
CR131
CR132
CR124
CR123
CR122
CR121
CR120
CR119
CR118
CR117
E102

REVISION LEVEL				
REV	DESCRIPTION	DATE	CHK	APP'D
E	EO# 12195 10-5-83 RES			
	REV. D IN HISTORY			
E	EO# 912 RECORD CHG. LCR			
	1500-0215 WAS 1500-0226			



BRANSON/IPC
a Smith Kline company

DRAWN	R.ESPIQUE	10-5-83
CHK		
ENG		
MFG		
QUAL		

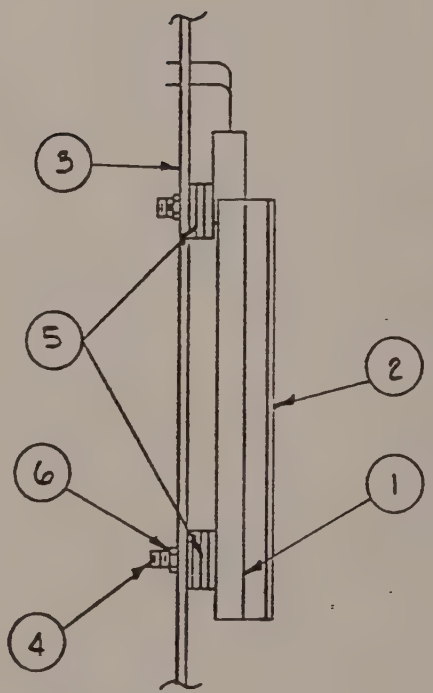
TOLERANCES UNLESS OTHERWISE SPECIFIED

TITLE
PM 112
HV RECTIFIER BD ASSY

NEXT ASSY

NOTE: (UNLESS OTHERWISE SPECIFIED)

MATERIAL LIST			
REF.NO.	DESCRIPTION	PART NO.	QTY.
	SEE SEPARATE EPL		



ASSY NO. 803399C

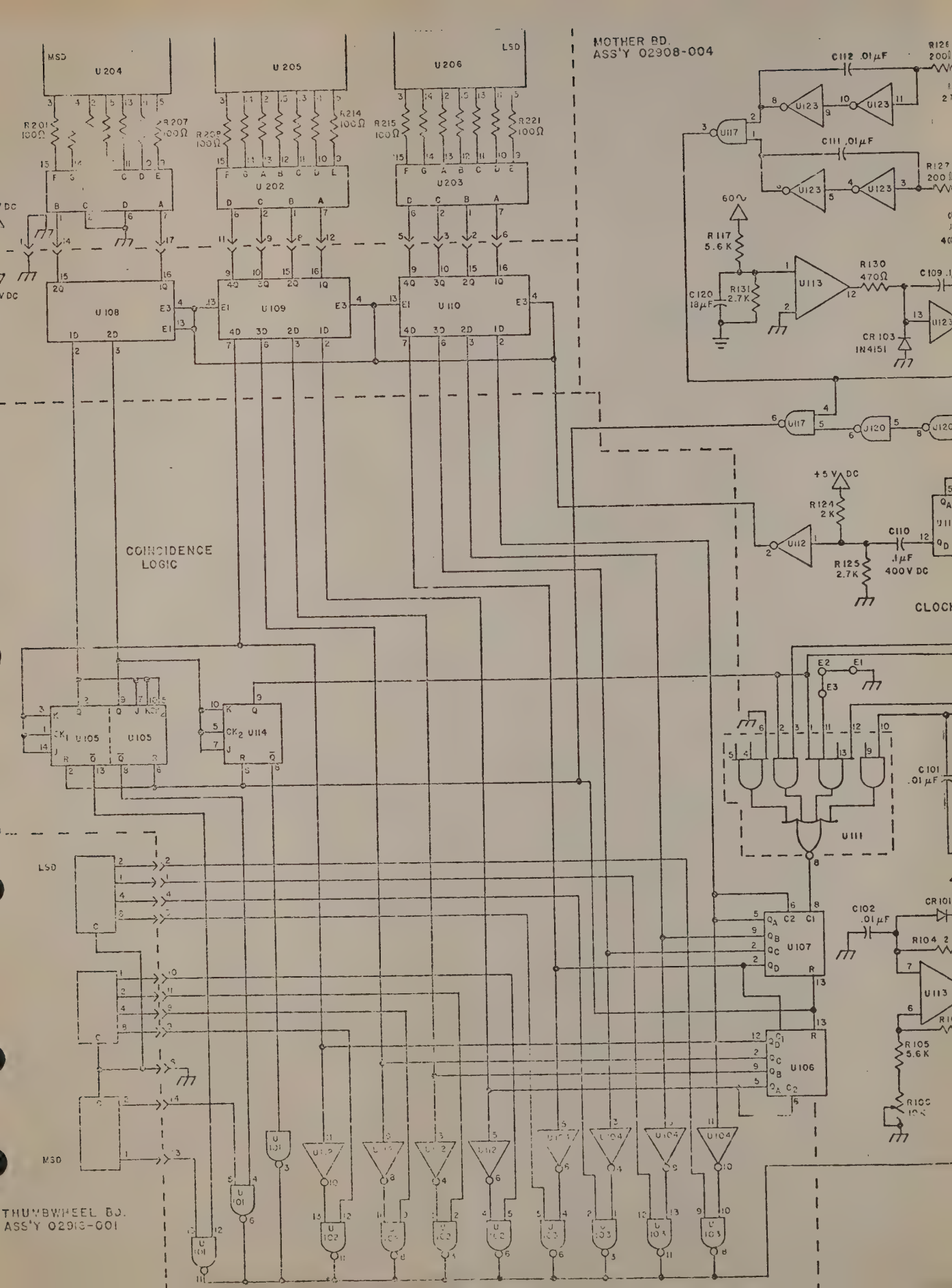
TP204

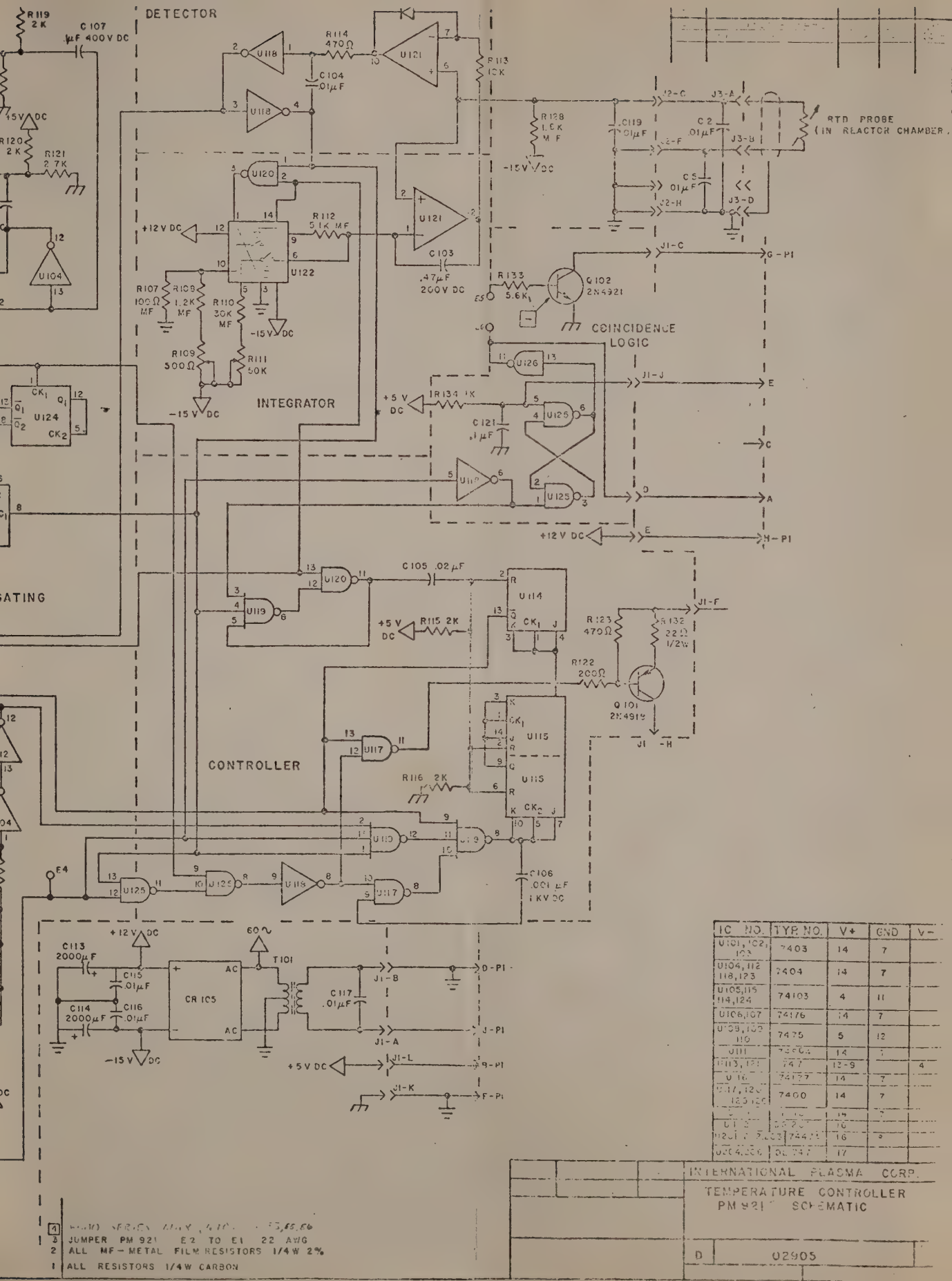
REV	DESCRIPTION	DATE	CHK	APPR
D	EO # 11226 AK	11-2-81		AB
C	EO = 10470 KG	11-27-78		

REVISION LEVEL

BRANSON/IPC
a SmithKline company

NEXT ASSY 04015	DFT K. QUINN	DATE 11-27-78	TOLERANCES UNLESS OTHERWISE SPECIFIED .XX± cm± SURF. FIN. √ .XXX± ANGLES±	
	CHK	DATE 11-12-81	TITLE PM 112 12V SUPPLY BD ASS'Y	
	ENG	DATE		
MODEL	FINISH		SCALE – SIZE C DRAWING NO. 03399 SHT 1 OF 1-3 REV D	

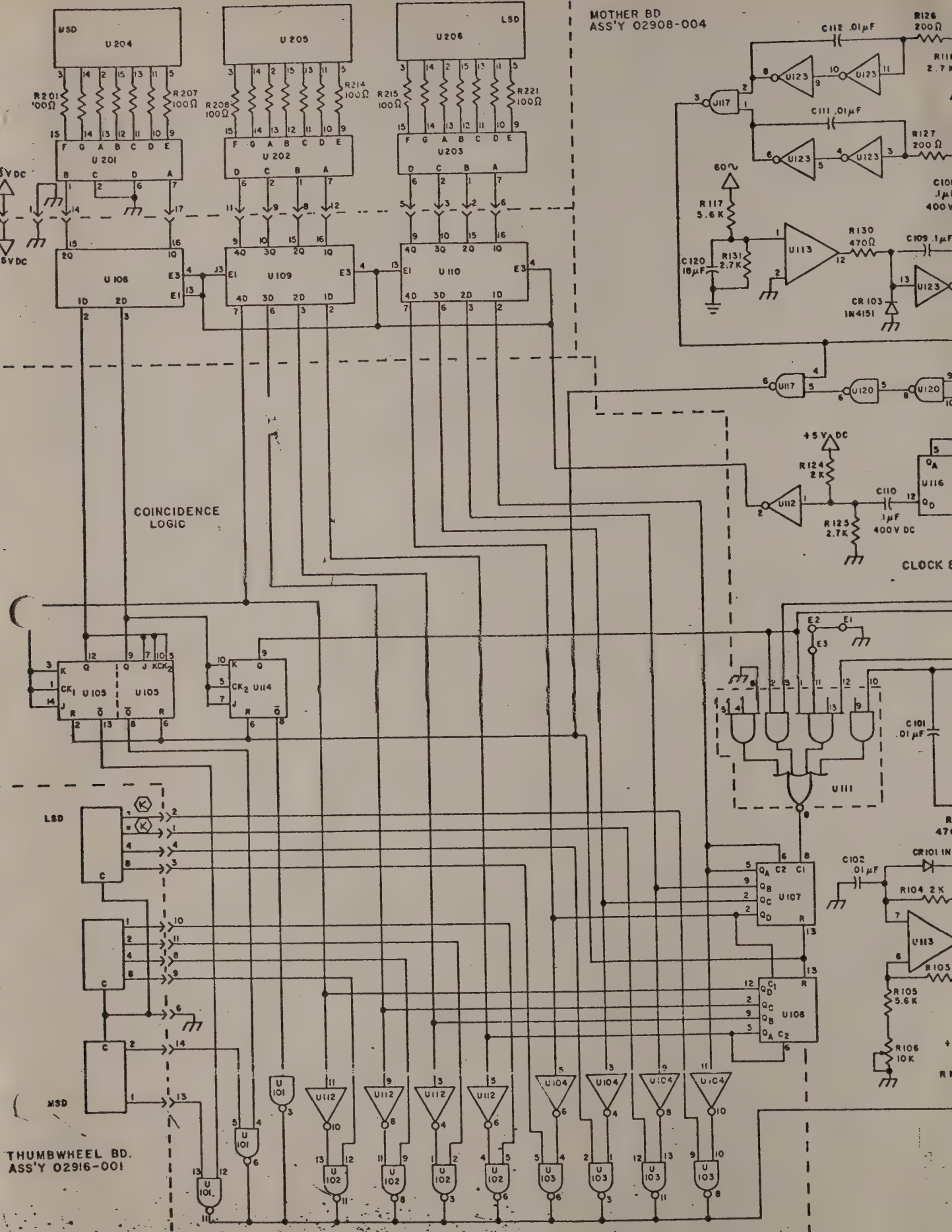

MOTHER BD.
ASS'Y 02908-004
MSD
LSD
U 204
U 205
U 206
U 202
U 203
U 108
U 109
U 110
R201 100Ω
R207 100Ω
R208 100Ω
R214 100Ω
R215 100Ω
R221 100Ω
COINCIDENCE LOGIC
U 105
U 114
U 111
U 107
U 106
U 113
U 123
U 117
U 120
U 112
C112 .01μF
C111 .01μF
C110 .1μF 400V DC
C102 .01μF
C101 .01μF
C120 18μF
R117 5.6K
R131 2.7K
R130 470Ω
R124 2K
R125 2.7K
R105 5.6K
CR 103 IN4151
60~
+5 V DC
CLOCK
THUMBWHEEL BD.
ASS'Y 02913-001

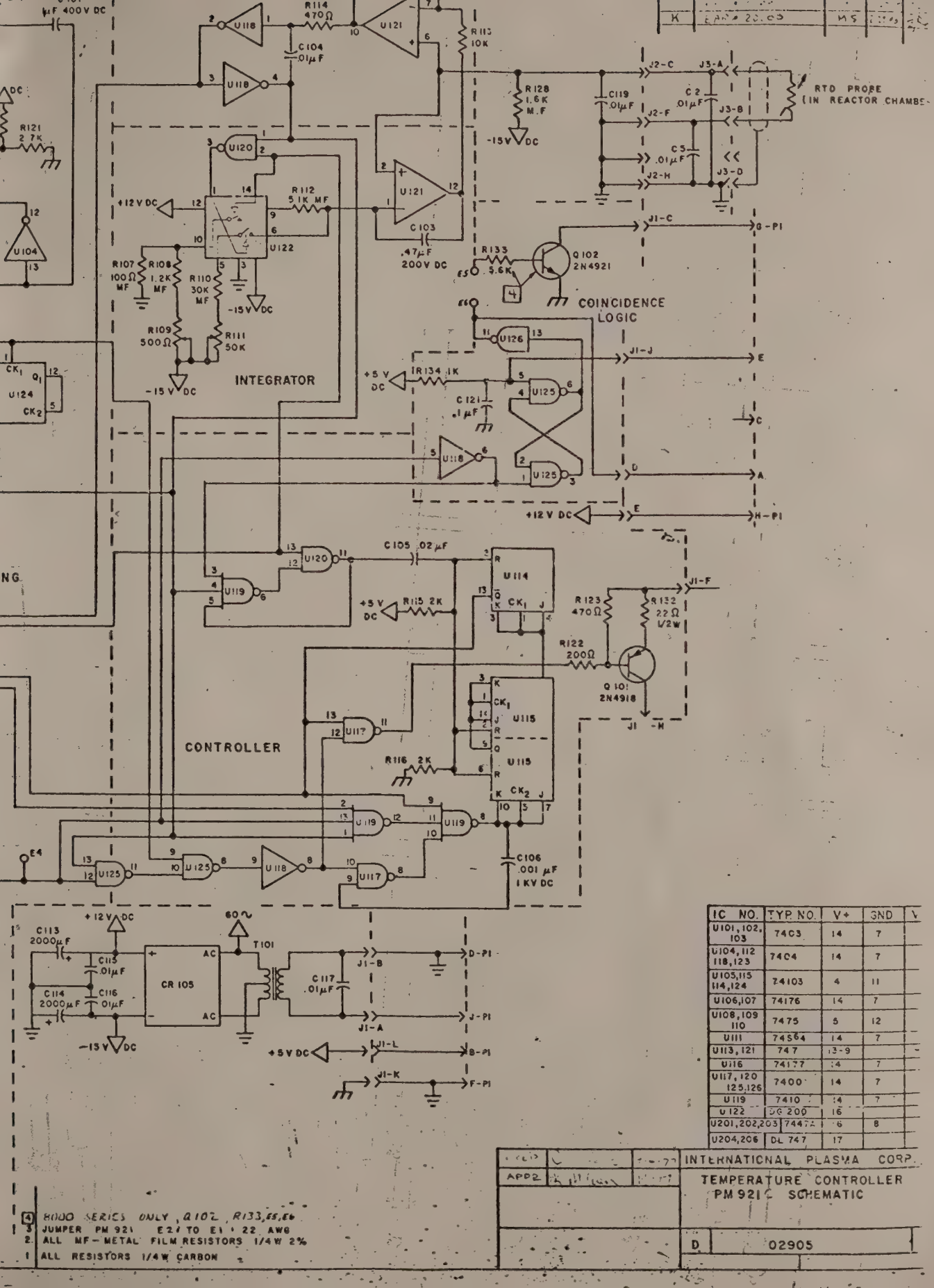


IC NO.	TYP NO.	V+	GND	V-
U101, 102, 103	7403	14	7	
U104, 112 118, 123	7404	14	7	
U105, 115 114, 124	74103	4	11	
U106, 107	74176	14	7	
U108, 109 110	7475	5	12	
U111	7[illegible]04	14	7	
U113, 121	747	12-9		4
U 16	74123	14	7	
U17, 120 122, 125	7400	14	7	
U [illegible]	[illegible]	14	7	
U1 [illegible]	[illegible]	16	8	
U2[illegible]	7442	16	8	
U[illegible]	DL 747	17		

	INTERNATIONAL PLASMA CORP.
	TEMPERATURE CONTROLLER PM 921 SCHEMATIC
D	02905

4 [illegible]
3 JUMPER PM 921 E2 TO E1 22 AWG
2 ALL MF - METAL FILM RESISTORS 1/4W 2%
1 ALL RESISTORS 1/4W CARBON

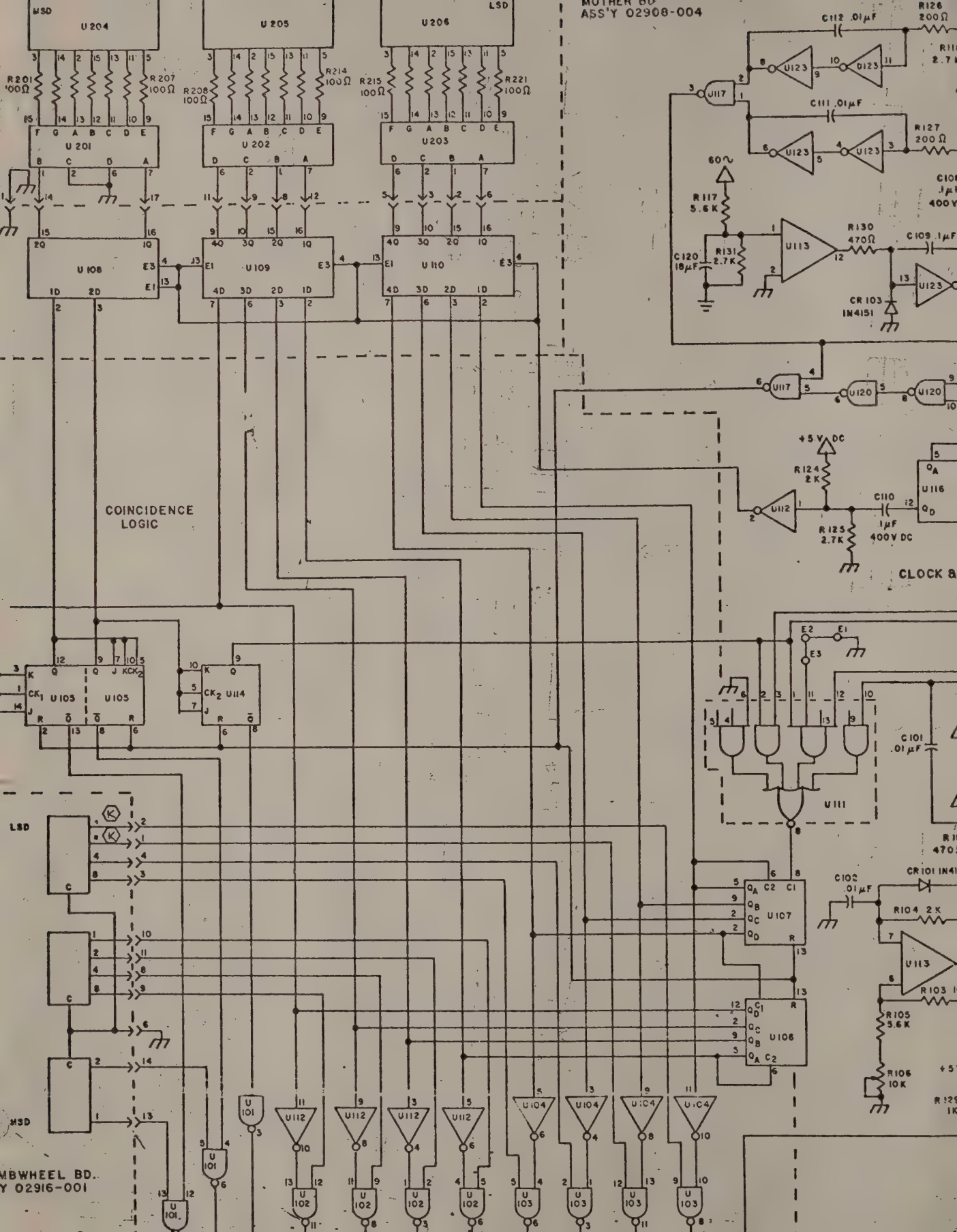

MOTHER BD
ASS'Y 02908-004
MSD
LSD
U 204
U 205
U 206
U 201
U 202
U 203
U 106
U 109
U 110
R201 100Ω
R207 100Ω
R208 100Ω
R214 100Ω
R215 100Ω
R221 100Ω
5V DC
5V DC
COINCIDENCE LOGIC
U 105
U 114
C112 .01μF
R126 200Ω
U123
U117
C111 .01μF
R127 200Ω
60~
R117 5.6K
C120 18μF
R131 2.7K
U113
R130 470Ω
C109 1μF
CR 103 IN4151
U120
+5 V DC
R124 2K
U112
C110 .1μF 400V DC
R123 2.7K
U116
CLOCK
U111
C101 .01μF
C102 .01μF
CR101 IN
R104 2K
R103
R105 5.6K
R106 10K
U107
U108
U104
U101
U102
U103
THUMBWHEEL BD.
ASS'Y 02916-001

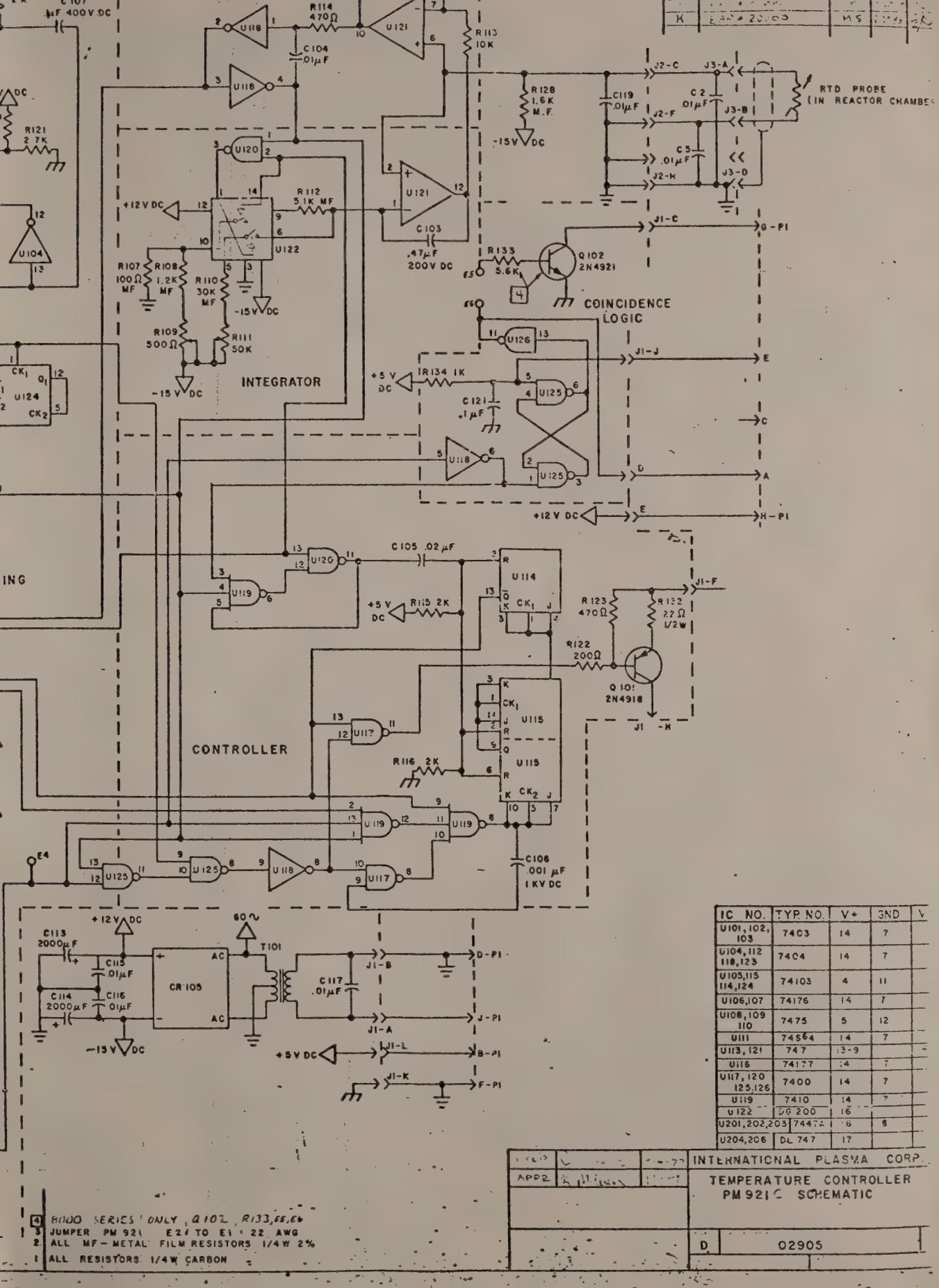


IC NO.	TYP NO.	V+	GND
U101, 102, 103	7403	14	7
U104, 112 118, 123	7404	14	7
U105, 115 114, 124	74103	4	11
U106, 107	74176	14	7
U108, 109 110	7475	5	12
U111	74S64	14	7
U113, 121	747	13-9	
U116	74177	14	7
U117, 120 125, 126	7400	14	7
U119	7410	14	7
U122	DG 200	16	
U201, 202, 203	7447A	16	8
U204, 206	DL 747	17	

4. 8000 SERIES ONLY, Q102, R133, E5, E6
3. JUMPER PM 921 E2 TO E1 22 AWG
2. ALL MF - METAL FILM RESISTORS 1/4W 2%
1. ALL RESISTORS 1/4W CARBON

APP'D			INTERNATIONAL PLASMA CORP.
			TEMPERATURE CONTROLLER PM 921 C SCHEMATIC
		D	02905

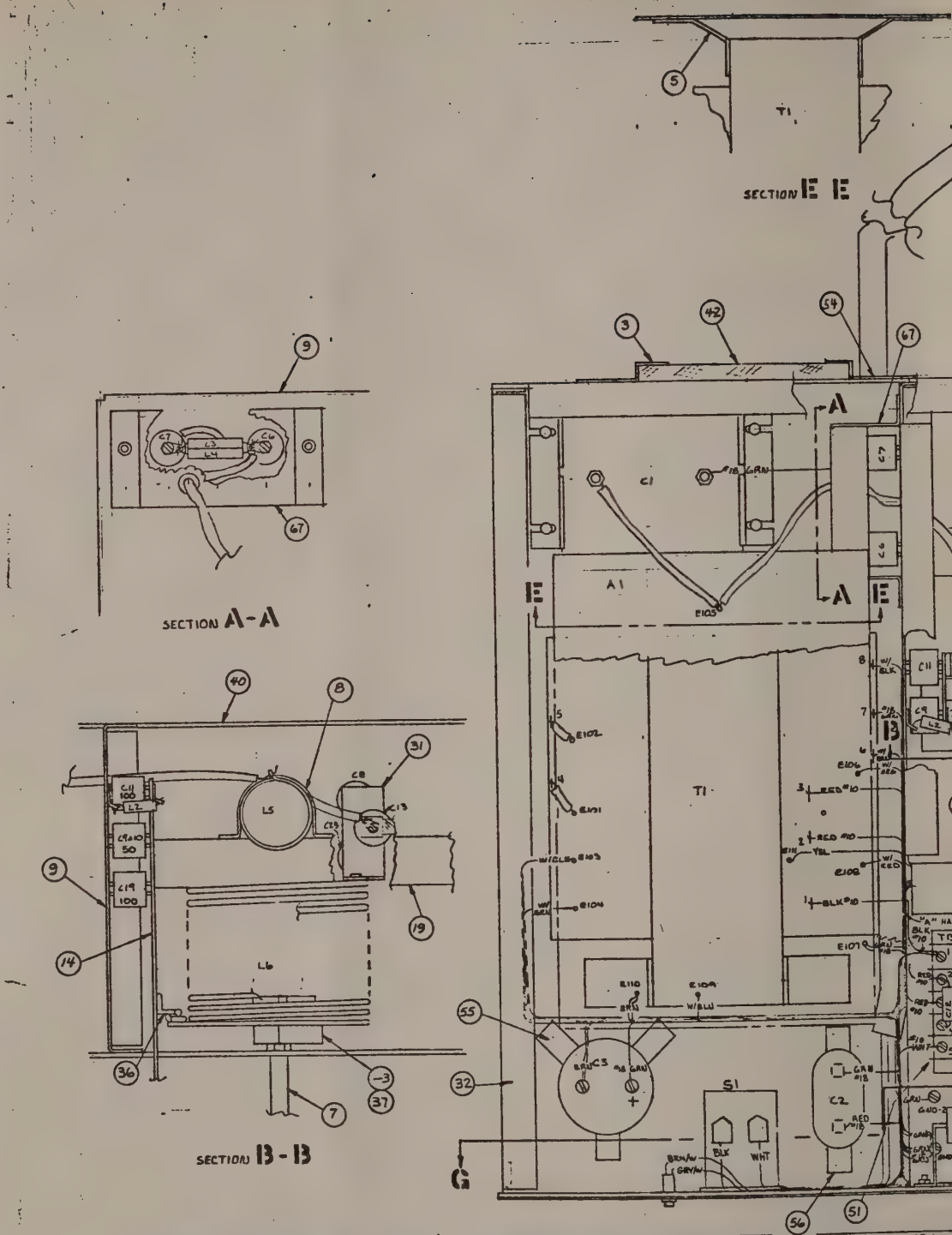

MOTHER BD
ASS'Y 02908-004
COINCIDENCE
LOGIC
CLOCK &
MSD
LSD
U 204
U 205
U 206
U 201
U 202
U 203
U 108
U 109
U 110
U 105
U 114
U 111
U 107
U 106
U 113
U 116
U 117
U 120
U 123
U 112
U 101
U 102
U 103
U 104
R201 100Ω
R207 100Ω
R208 100Ω
R214 100Ω
R215 100Ω
R221 100Ω
R117 5.6K
R130 470Ω
R131 2.7K
R124 2K
R125 2.7K
R104 2K
R105 5.6K
R106 10K
C120 18μF
C110 1μF 400V DC
C101 .01μF
C102 .01μF
C109 .1μF
C111 .01μF
C112 .01μF
R126 200Ω
R127 200Ω
CR 103 IN4151
CR101 IN4
60~
+5 V DC
MBWHEEL BD.
Y 02916-001



IC NO.	TYP NO.	V+	GND	V
U101, 102, 103	7403	14	7	
U104, 112 118, 123	7404	14	7	
U105, 115 114, 124	74103	4	11	
U106, 107	74176	14	7	
U108, 109 110	7475	5	12	
U111	74S64	14	7	
U113, 121	747	13-9		
U116	74177	14	7	
U117, 120 125, 126	7400	14	7	
U119	7410	14	7	
U122	DG 200	16		
U201, 202, 203	7447A	16	8	
U204, 206	DL 747	17		

4 8000 SERIES ONLY, Q102, R133, E5, E6
3 JUMPER PM 921 E21 TO E1 22 AWG
2 ALL MF - METAL FILM RESISTORS 1/4W 2%
1 ALL RESISTORS 1/4W CARBON

APPD		INTERNATIONAL PLASMA CORP.	
		TEMPERATURE CONTROLLER PM 921C SCHEMATIC	
		D	02905



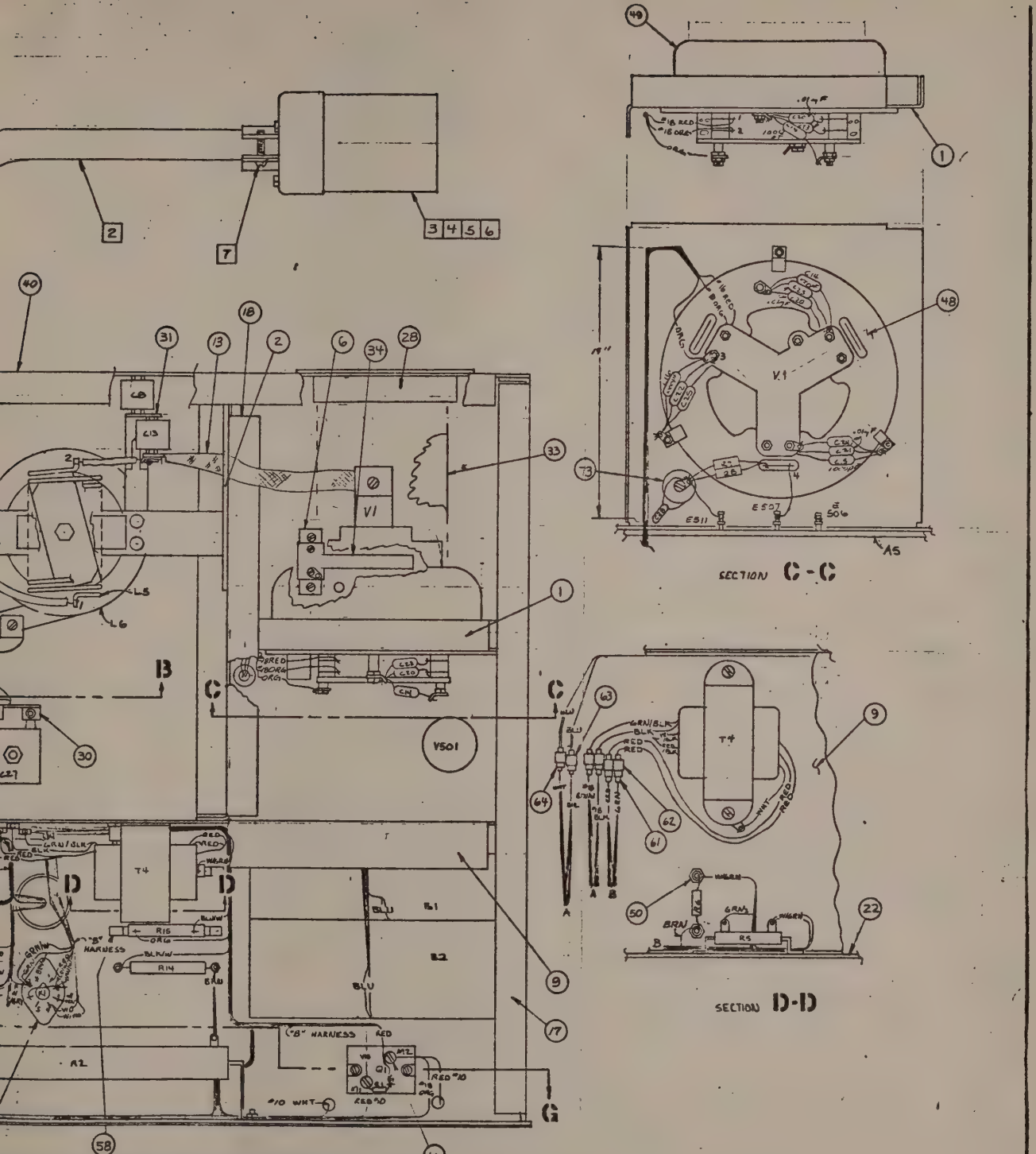
"A" HARNESS			
COLOR	START	BREAK OUT	END NOTE
#20 BLK	R1-1		TB1-1
#20 WHT	S1-2		TB1-5
#10 WHT	TB1-5		L1-L
#10 RED	Q1-M2		L1-R
#10 BLK	T1-1		TB1-1
#10 RED	T1-3		TB1-2
#18 RED	T1-3	TB1-3	Q1-A*
#18 GRN	C1-1		G1-H
W/E KI	E103		T1-3
#18 GRN	T1-1	E107	G1-C

W/RED	E108		E8 WIRES
W/BRN	E104	T1-6	A-R
#18 RED	R4-4		C1-1
#18 GRN	C2-2		G1-2
W/BLU	E109	R2-R	R3-L
BRN	C3-	E110 R14-R	E7E8
#18 GRN	C3+		G1-C-1
BRN/W	2V-B		A1-Z
GRY/W	QS1-A		A1-7
#18 BLK	TB1-1		S1-1
#18 WHT	TB1-5	B2-1	S1-2
#18 ORN	Q1-M1	B1-2	Q1-E
#18 [illegible]	TB1-4		T4-5
#18 BLK	TB1-1		T4-2
#18 BLK	TB1-1		T4-1
#18 WHT	TB1-5		T2-3

#18 GRN	A3-4		GND-1	
W/GRN	A3-2	E510	T1-6.3V	
#18 GRN	A6-10		GND-	
#18 GRN	A6-11		GND-	
#18 GRN	A6-12		GND-	
#18 GRN	J1-L		GND-	
#18 GRN	J2-D		GND-	
W/BLU	A3-R		E1-A	
	C1+	E105	C6	HIGH VOLTAGE LEADS
	C7		T5	
	L5-2		C13	
#18 RED	T1-3		V1-1	
#18 ORG	T1-6.3V		V1-2	
GND	TP-2		V1-3	
GRN/W	A3-1	E508	T2-10A	
YEL	R9-1		E704	

JUMPERS				
E101			T1-4	
E102			T1-5	
C1		E105	C6	HIGH VOLTAGE LEADS
C7			L5-1	
L5-2			C13	
T4-3/8			T4-8V	
E507			V1-4	BUSS WIRES
E511			C29	

COLOR	START	BREAK O
VIO	Q1-M1	
RED	Q1-G	
RED	T4	
GRN	T4-R2	
W/GRN	R2-R	R5-1
[illegible]	R5-L	
GRN	W1-7	
BLK/W	KM-L	
BLU/W	K5-R	F1-3 T
ORG	Q12-L	
[illegible]	L-1	R10
YEL	E1-1	
YEL/RED	P1-3	
W/VIO	K1-4	
BRN/W	K1-R	D52-1
GRN/W	K1-7	
BLU/W	W1-2	
[illegible]	T5-10	
[illegible]	T4-4	
W/YEL	T2-B	
GRN	R12-2	R11
[illegible]	P1-1	A2-14
[illegible]	K1-1	
BAT	E10-1	
[illegible]	R10-2	



GRN	A3-15	TP-6 A2-8		A6-10	
BLU	A3-8			A2-18	
GRN	A3-14	A3-6		A3-4	
BLK	A3-7			T3-COM	
ORG	A3-3	A2-15 E710		J1-4	
GRN	A3-2			GND-	
GRN	A2-17			GND-	
WHT	A2-21			J1-D	
ORG	A1-21			A4-R	
WHT	A6-12			A4-F	
RED	A1-6			J1-P	
RED	A4-5			J1-N	BELDEN 8762
GND				GND	
RED	A6-8			J1-A	
BLK	A6-7			J1-C	BELDEN 8772
BLK	A6-1			J1-B	
SHLD				GND	
WHT	A6-3			J1-D	
GRY	E504			TP-3	
GRN	TP-A			GND	
RED	R9-2	R9-3 E504		E703	
				T3-C7	
BLK	T2-4			GND-1	
GRN	T2-6				
VIO	A3-16	TP7 A2-16 A6-10	E704	J1-K	
				GND	
GRN	T3-C1				
WHT	A6-19			E705	
BRN	E702			E512	
GRN	E701			GND	

J	EO 10721	KG	11-78		
H	9811566	D			
G	EO 10489	KG	2-6-79		
F	EO 10381	KG			
E	EO 10376	KG			
D	EO 10376	KG			
C	ADD 10 [illegible] DWGNO 5	JVB			
B	EO 10349	JV			
A	[illegible]				

7 TIGHTEN CORD GRIP SCREWS

6 REPLACE INTERIOR INTO METAL COVER AND ROTATE CLOCKWISE BEFORE TIGHTENING THREE HEX HEAD SCREW ON BACK

5 LOOSEN AND BACK OFF ALL TERMINAL SCREWS. INSERT ALL CONDUCTORS INTO ENTRANCE HOLES FULLY AND TIGHTEN ALL SCREWS TO APX 25" LBS

4 DO NOT SOLDER ENDS OF CONDUCTORS

3 STRIP CABEL JACKET 1.50" STRIP INSULATION .75"

2 AC POWER CABLE 10 FT MIN. FROM REAR PANEL

1 DRESS ALL LEADS AS SHORT AS POSSIBLE

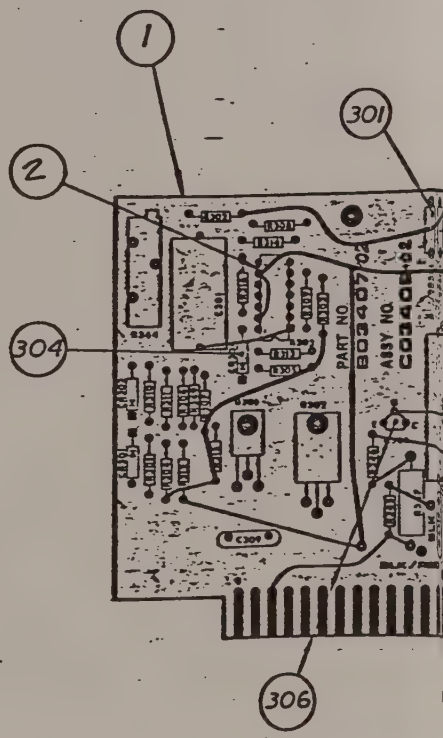
INTERNATIONAL PLASMA CORP

PM 112
TIP ASS'Y & WIRING

04013

NOTES:

1. CUT TRACE FROM C308 TO R332 ON COMPONENT SIDE.
2. CUT TRACE FROM C308 TO GROUND ON NON-COMPONENT SIDE
3. PUT SLEEVING ON CAPACITOR 308 LEADS.
4. ON COMPONENT SIDE, PLACE A 28 GAUGE JUMPER WIRE WITH SLEEVING FROM CAPACITOR 308 SIDE CUT IN INSTRUCTION #1 TO JUNCTION OF R333 AND R331
5. ON COMPONENT SIDE, PLACE A 28 GAUGE JUMPER WITH SLEEVING FROM C308 SIDE CUT IN INSTRUCTION #2 TO JUNCTION OF R337, R338 AND R336.



COMPONEN

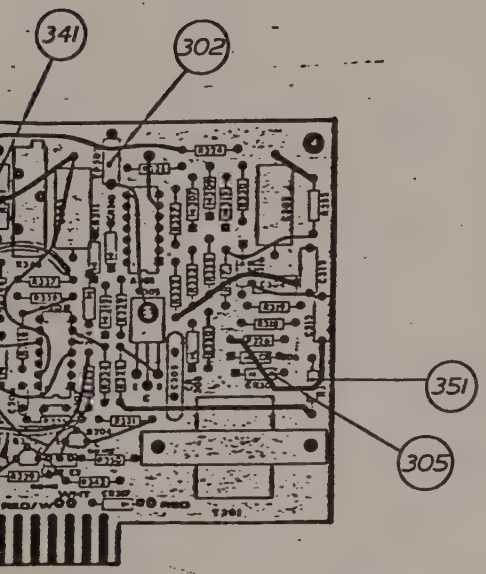
BLUE COPY/CB/ACCUPRESS
BLUE CB NO. 44751

MATERIAL LIST			
REF. NO.	DESCRIPTION	PART NO.	QTY.

E.

LEEVING
TION

NG



JUMPER WITH SLEEVE
2X

SIDE

03409-02
PART NO.

REV	DESCRIPTION	DATE	CHK	APPR
Q	JUMPER ADDED ... EO 793	4.11.85		
P	E.O.#624, 03409-02 SUPERSEDES 03409	12-1-84		
N	E.O. # 10960 M.S.	12-80	1-14-81	
M	EO 10913 (P.L only)	10-80		
L	E.A.R. #20416 AR	9-80		PLB

REVISION LEVEL

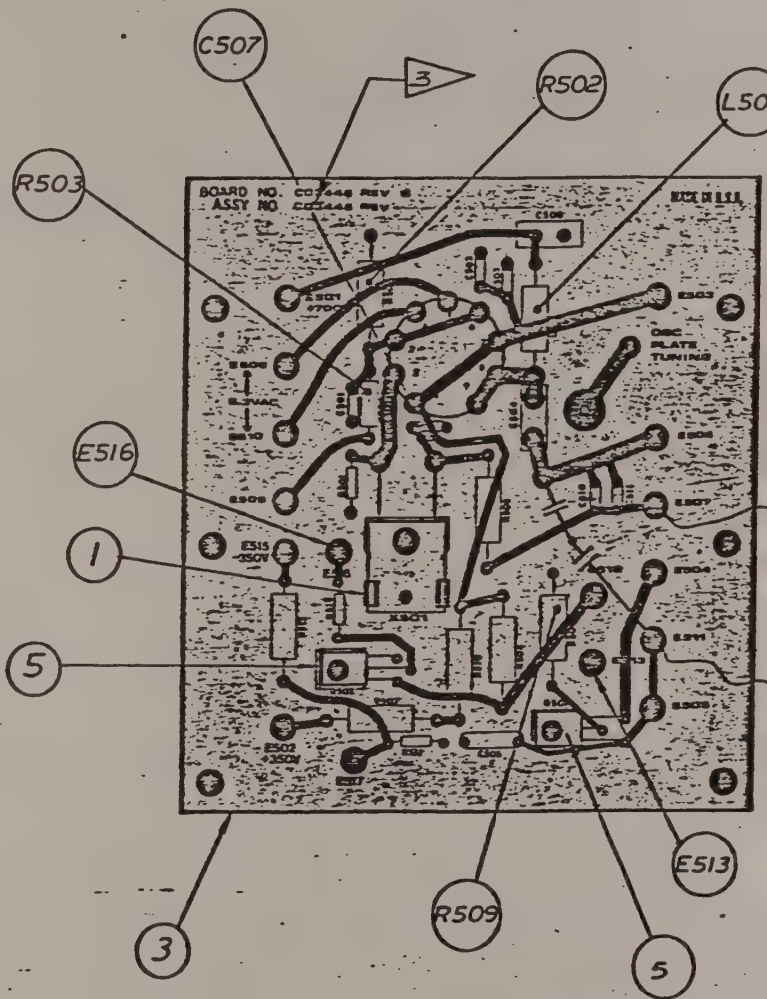
DIONEX GAS PLASMA DIVISION
31133 SAN BENITO
HAYWARD, CALIF. 94544

DRAWN A. ROCHA	DATE 9-24-80	TITLE ASSEMBLY DRAWING H.V. REGULATOR BOARD PM112 R.F. GENERATOR	
CHECKED RV	DATE 1-14-81		
ENG.	DATE	DRAWING NO. C 03409-02	REV. Q
SCALE 1:1		DO NOT SCALE THIS DRAWING	SHEET 1 OF 5

NEXT ASSY. E04015

NOTES:

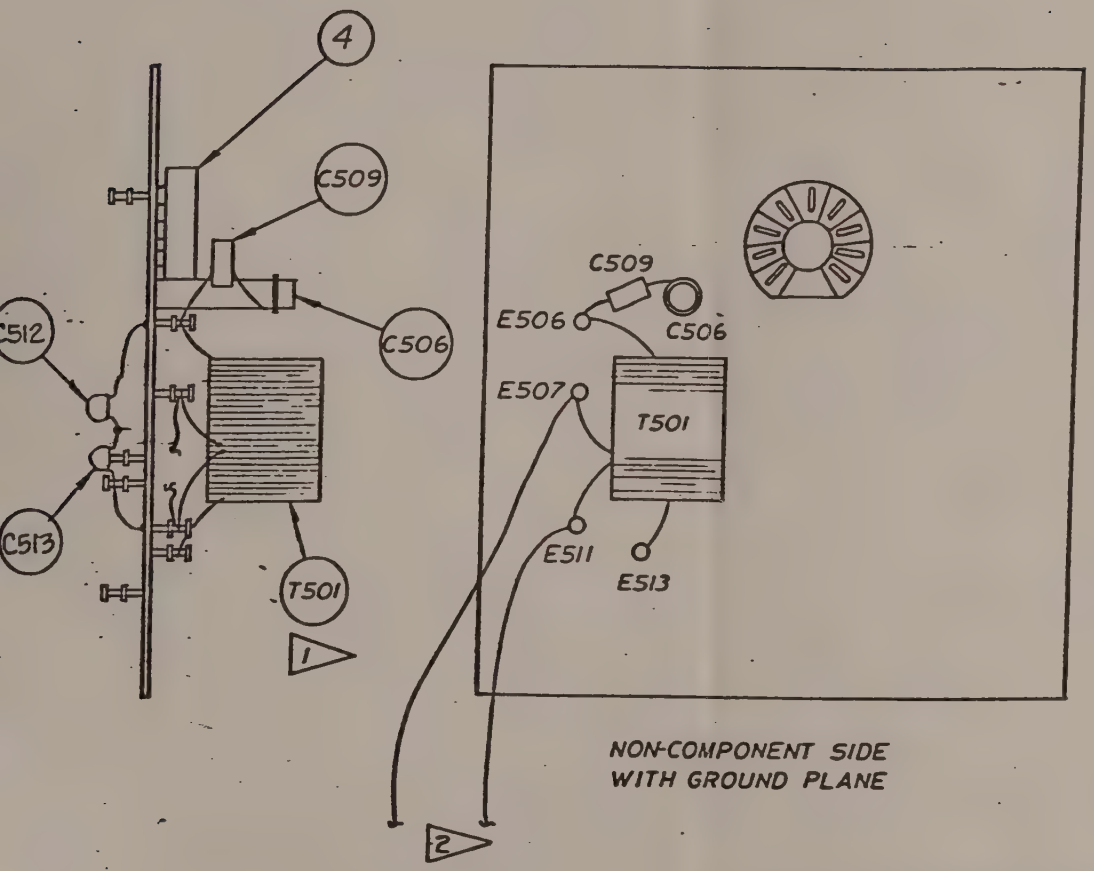
1. FOR OSCILLATOR TRANSFORMER COIL SEE DRAWING NO. B04162 REV. A
2. ADD 2 EA. 2.50" 20GA BUSS WIRE AT E507 AN
3. PERMANENTLY MARK WITH PART NUMBER AND REVIS IN AREA INDICATED. USE CONTRASTING COLORED . MIN CHARACTERS.



COMPONENT SIDE

WIRING,
FOR INSTRUCTIONS.
E511
LEVEL
HIGH

MATERIAL LIST			
REF. NO.	DESCRIPTION	PART NO.	QTY.



NON-COMPONENT SIDE
WITH GROUND PLANE

REV	DESCRIPTION	DATE	CHK	APPR
L	DELETED B04162 ... EO 797	2-28-83		
K	EO # 12196 RFE	10-12-83		
J	EO # 11239 AK	11/81		
H	E.O # 11010 EA	3/81		
G	E.O. # 10852 AR	10/80		

REVISION LEVEL

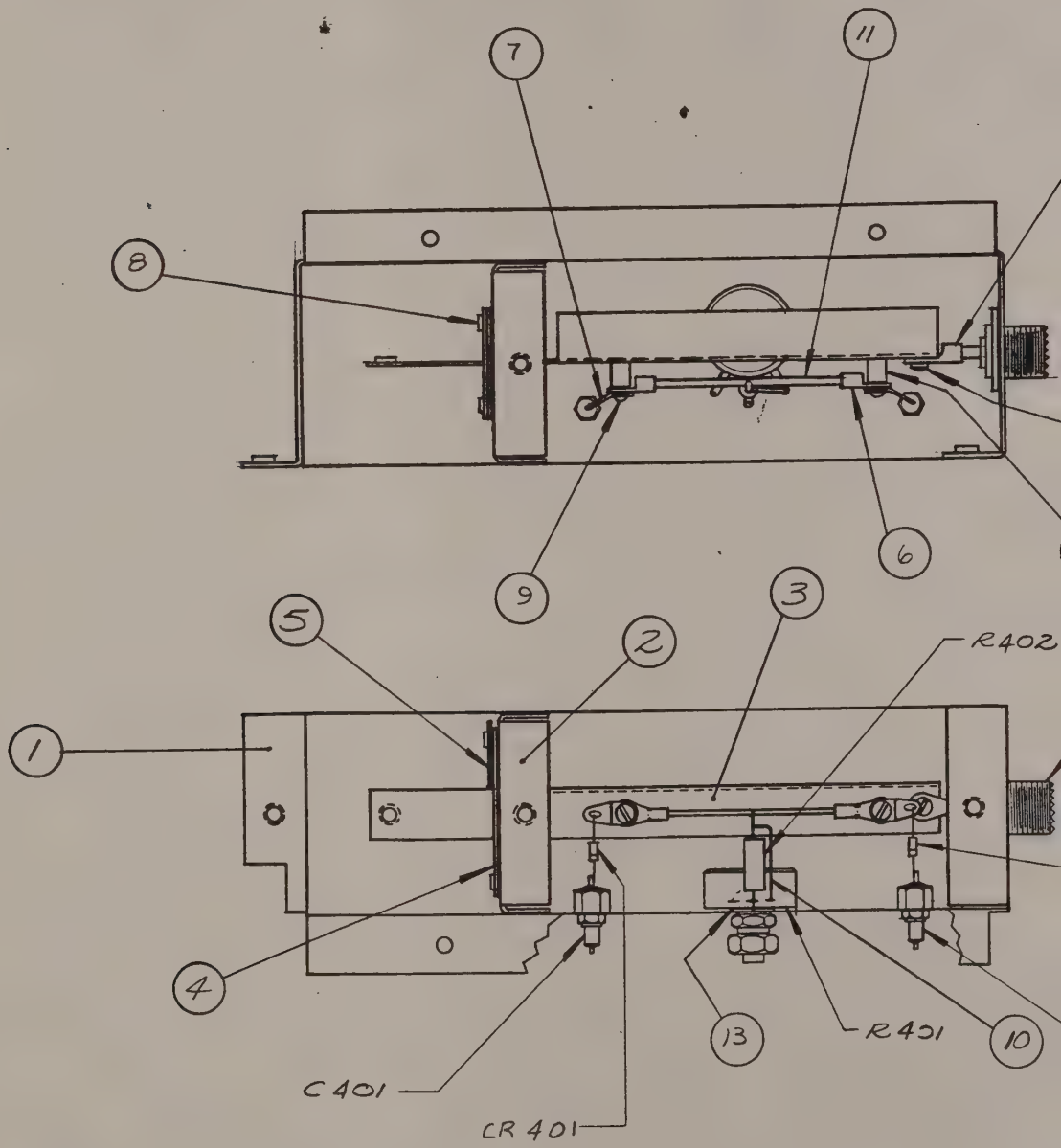
DIONEX GAS PLASMA DIVISION
31133 SAN BENITO
HAYWARD, CALIF. 94544

DRAWN A. ROCHA	DATE 10/17/80	TITLE ASSEMBLY PRINT OSCILLATOR BOARD PM 112 GENERATOR	
CHECKED	DATE		
ENG.	DATE 10-17-80	SIZE C	DRAWING NO. 03448 REV. L
SCALE 1:1		DO NOT SCALE THIS DRAWING	SHEET 1 OF 3

NEXT ASSY.

NOTE:

1. FOR COMPLETE BILL OF MATERIALS SEE SHEET 2



REVISIONS				
LTR	DESCRIPTION	CHK	DATE	APPROVED
B	REVISED		9-25-78 A. ROCHA	
C	E.O. #10349		9-27-78 A. ROCHA	
D	EO # 10367		11-9-78 EG	

6

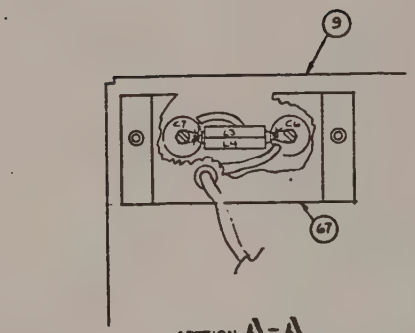
14

J401

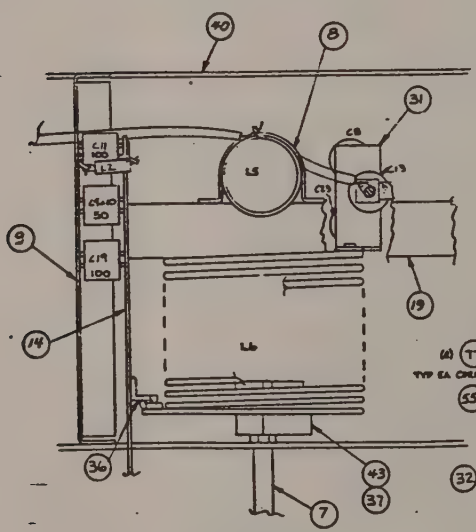
CR402

C402

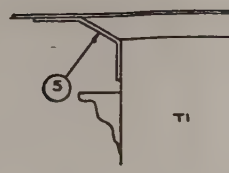
04015-001	NEXT ASSY	TOLERANCES UNLESS OTHERWISE SPECIFIED FRACTIONS DEC ANGLES ± ± ±	INTERNATIONAL PLASMA CORP
		APPROVALS / DATE: DRAWN A. ROCHA 4-78; CHECKED [illegible] 4-78	A-6 RF COUPLER ASSY PM 112
			SCALE None · SIZE D · DRAWING NO 03810 · REV D
		DO NOT SCALE DRAWING	SHEET 1 OF 3



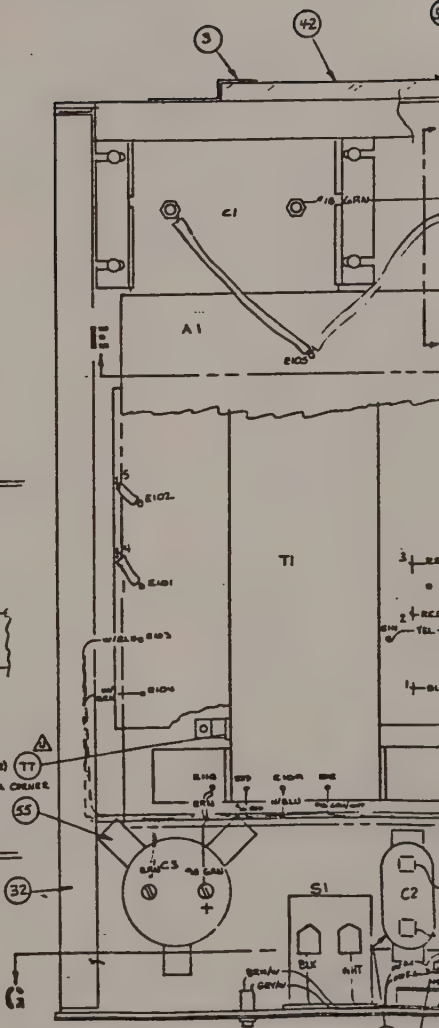
SECTION A-A



SECTION B-B



SECTION E



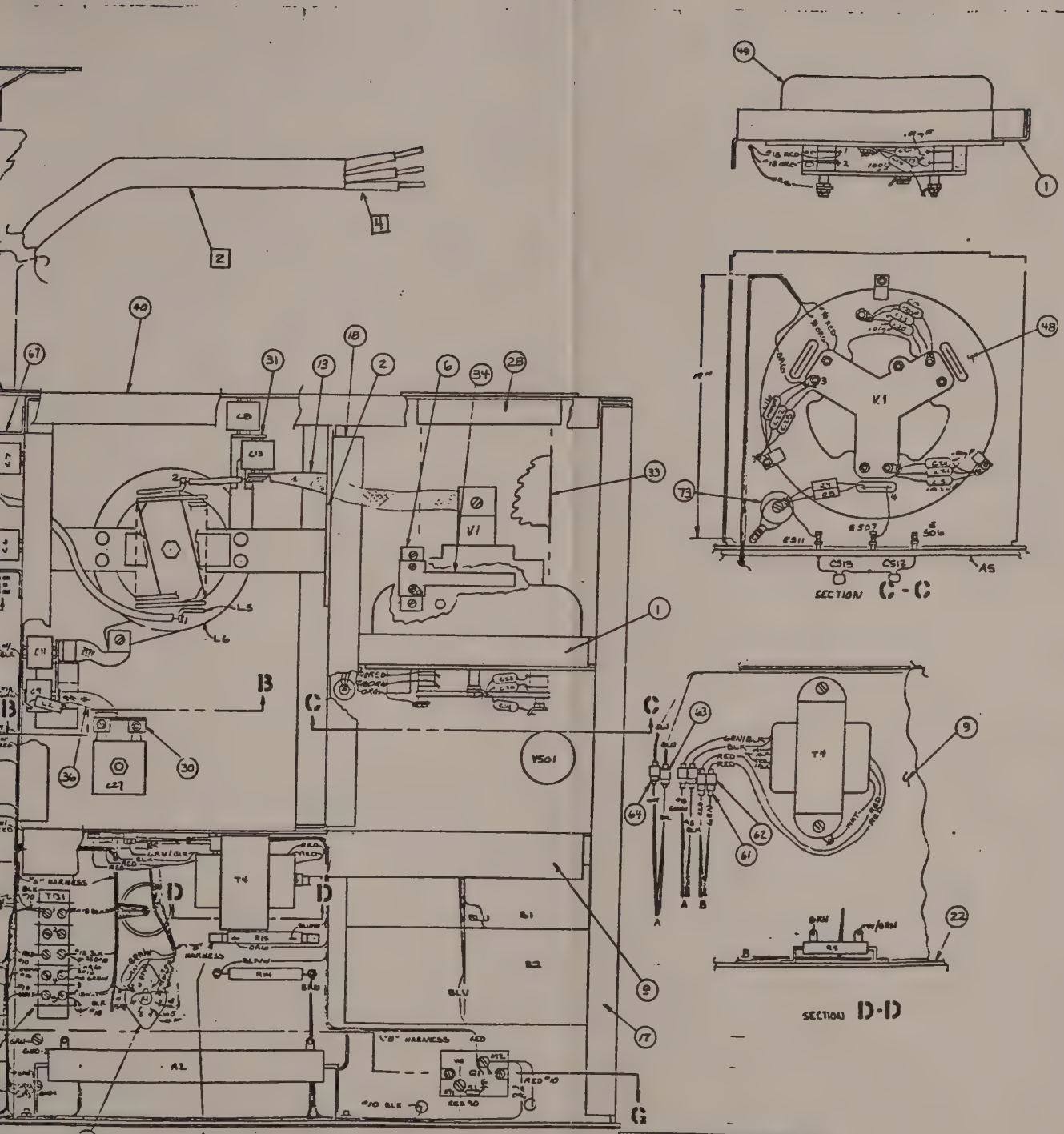
"A" HARNESS

COLOR	START	BREAK PNT	END	NOTE
#20 BLK	E1-1		T31-1	
#20 WHT	A1-2		T31-5	
#20 BLU	T31-4		E6	
#20 RED	D1-M1		L1-R	
#18 BLK	T1-1		T31-1	
#18 RED	T1-2		E113	
#18 RED	T1-3	T31-3	A1-M11	
#18 GRN	C6-1		GND-1	
WIR A	E103		T1-5	
WIRE	E1-1	E2-1	W1-1	
WIRE	E104		A1-11	1000V
WIRE	E108		E3L1	WIRES
WIRE	E106	T1-6	A2-R	
#18 RED	A2-L		E3-1	
#18 BRN	E3-2		GND-1	
WELD	E109	A2-R	A2-L	
BRN	E3-	E110 A2-A	E2105	
#18 BRN	E30		GND-1	
BRAID	L5-B		A1-2	
BRAID	L5-1-A		E1-7	
#18 BLK	T6-1	B1-1	B1-1	
#18 WHT	T21-3	B1-2	B2-2	
#18 RED	W1-M1		T3-1A	
#18 BLK	T7-1		T3-1A	
#18 BLK	T7-3		T3-5	
#18 BLK	T21-1		T2-1	
#18 WHT	T5-5		T1-2	
#18 GRN	T2-5		GND	
#18 BLK	T2-2		A2-4	
#18 GRN	T2-1		A2-9	
#18 BLK	T2-4		A1-13	

#18 GRN	A5-1	E810	GND-1	
WIRE	A5-2		C-2.5V	
#20 BLK	F6		L1-L	
#18 GRN	T10-18		L2-1	
#18 GRN	A6-11		GND-	
#18 GRN	A6-A		GND-	
#18 GRN	A5-A		W2-	
#18 GRN	A5-A		W2-	
WIRE	A2-A		P1-A	
	C1-2	E105	L6	HIGH
	C7		T5	VOLTAGE
	L5-2		C13	LEADS
#18 RED	T3-10A		V1-1	
WIRE	T3-6.3V		V1-2	
WIRE	T2 2		J1-3	
WIRE	A3-1	E208	T3-10A	
WIRE	R9-1		E704	
#18 BLK	T8-9		E113	

JUMPERS

E101	E105	T1-4	HIGH VOLTAGE LEADS
E102		T1-5	
C1		L6	
C7		L5-1	
L5-2		C13	
T4-10A		T4-8V	
C-2.5		V1-4	
C5A		C5A	BULB WIRE W/ TEFLON SLEEVING
C5B		A1-2	
T4-W		GND	

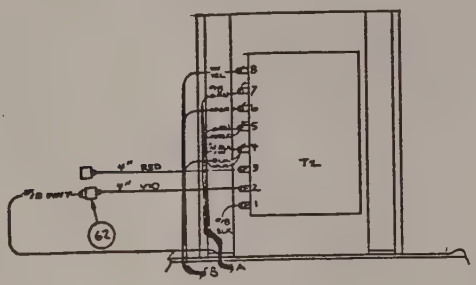


AD	E.O.#624				
AC	722-12940-01 ADDED/E.O.#631				
AB	E.O.# 592				
AA	E.O.#12196				
Z	E.O.#12195				
Y	E.O.#12046				
X	E.O.#11683				
W	E.O.#11527				
V	E.O.#1524				
U	E.O.#11208				
T	E.O.#11153				
S	E.O.#11010				
R	E.O.#10859				
O	E.O.#10872				
N	CARRIED FORWARD				
J	E.O. 10721				
M	REVISED				
G	E.O. 10483				
F	E.O. 10381				
E	E.O. 10361/.10363				
D	E.O. 10376				
C	ADDED PART #20410 ON SHT #3				
B	E.O.#10349				
A	REVISED PER E.O.				

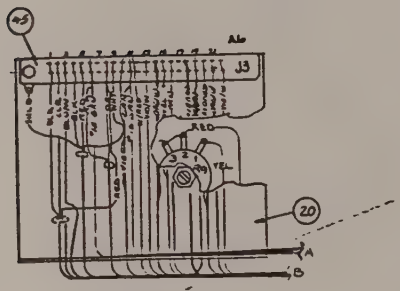
AH	INCLUDES WIRE #10 TO "E" ... E.O.#
AG	P/O 15081-01 ADDED
AF	ITEM #21 QTY WAS 6, ITEM #22 WAS 7
AE	E.O.#631

4. DO NOT SOLDER ENDS OF CONDUCTORS
3. STRIP CABLE JACKET 1.50" STRIP INSULATION .75".
2. AC POWER CABLE 10 FT MIN. FROM REAR PANEL
1. DRESS ALL LEADS AS SHORT AS POSSIBLE

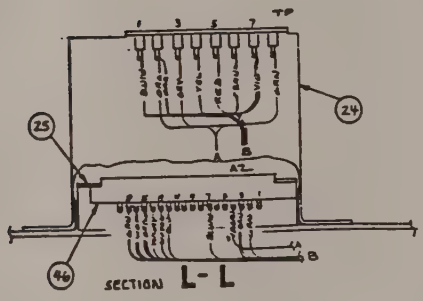
	INTERNATIONAL PLASMA CORP
	FM112 TOP ASS'Y & WIRING
	04015



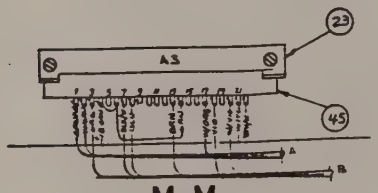
SECTION H-H



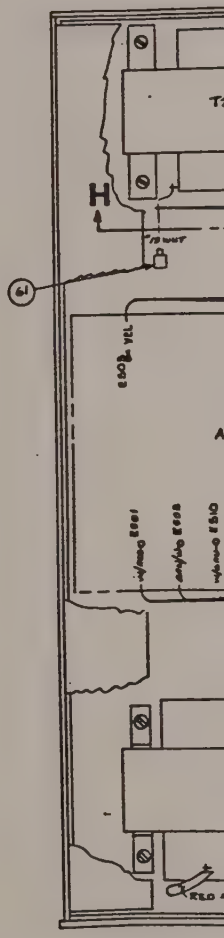
SECTION K-K

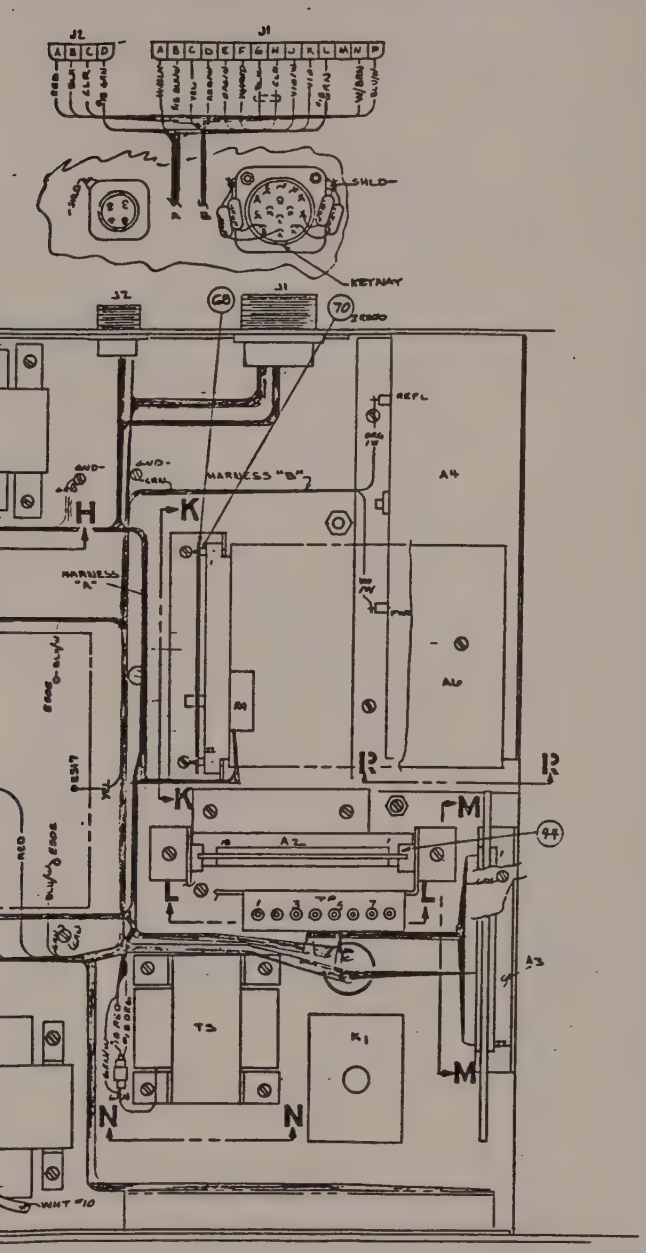


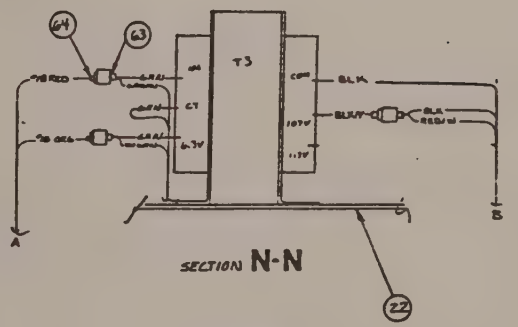
SECTION L-L



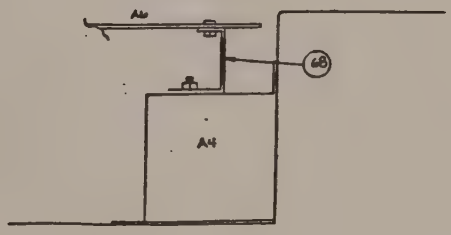
SECTION M-M





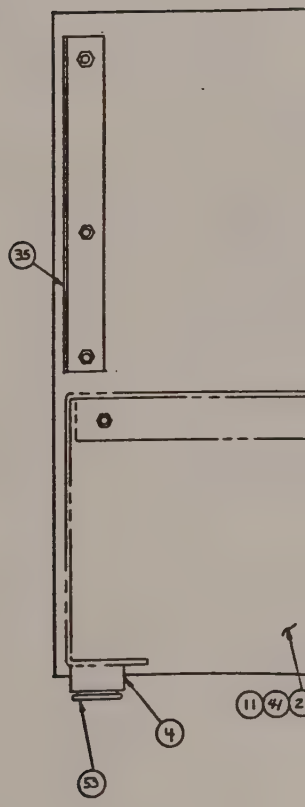


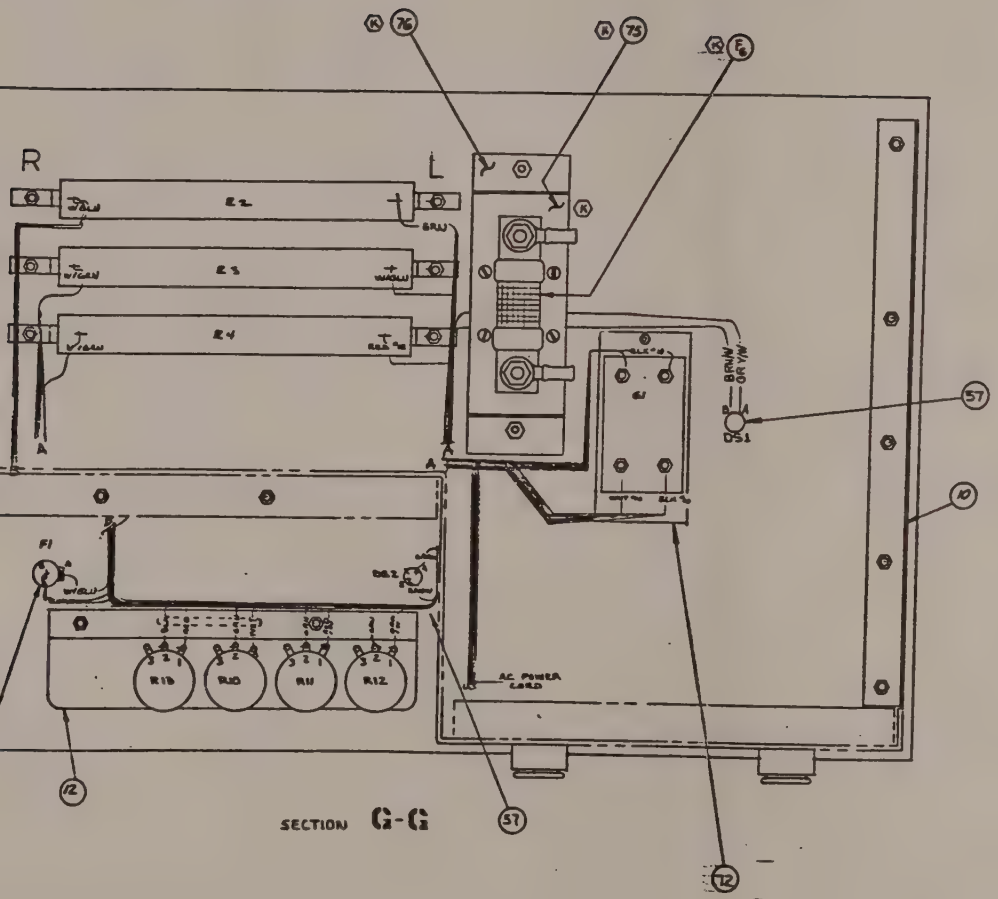
SECTION N-N



SECTION R - R

	INTERNATIONAL PLASMA CORP.	
	PM 112 TOP ASS'Y & WIRING	
	64018	AN
	3 OF 17	

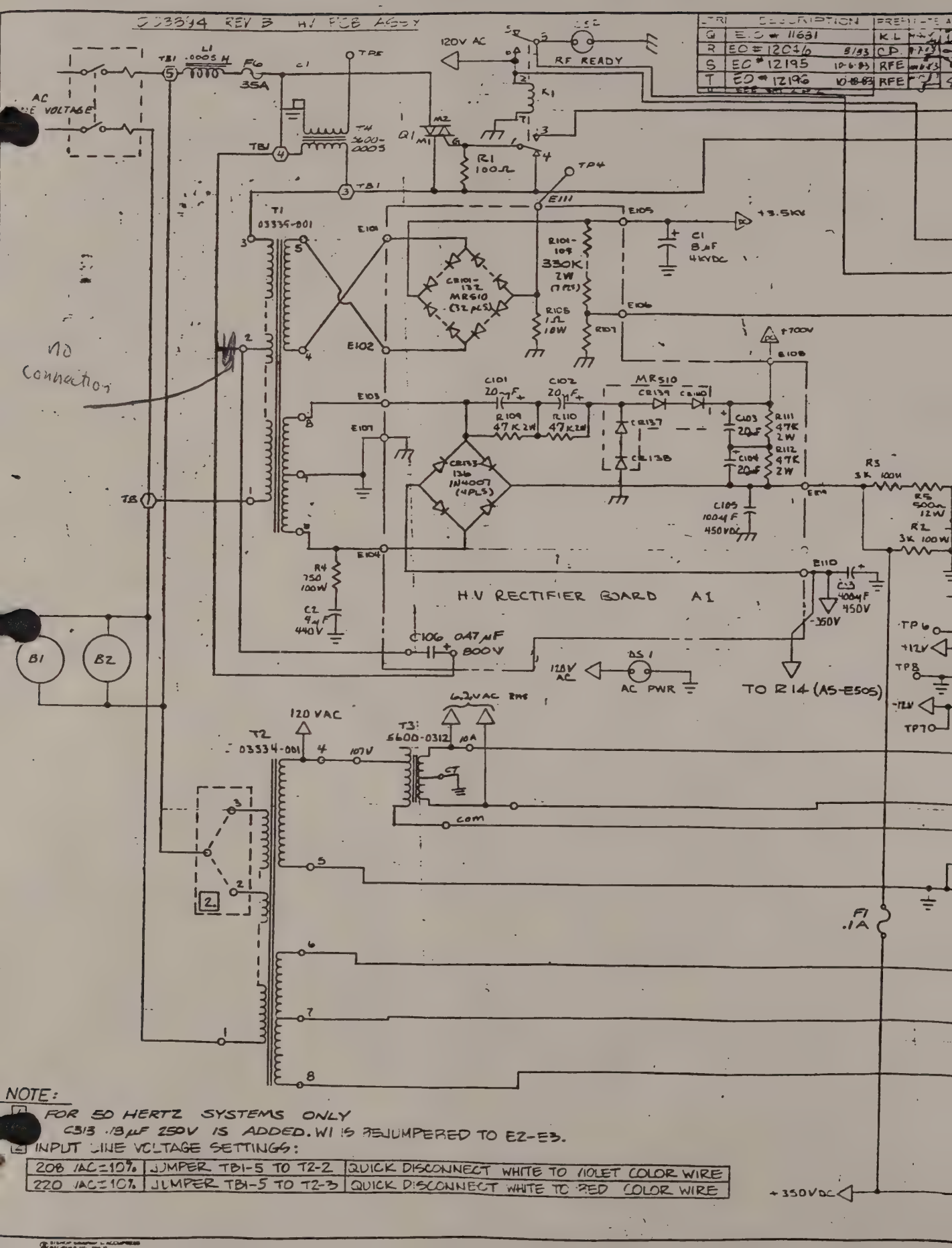

35
11
41
2
4
53



		INTERNATIONAL PLASMA CORP
		PM 112 TOP ASS'Y & WIRING
		OH013

03334 REV B HV PCB ASSY

LTR	DESCRIPTION		APPR
Q	E.O # 11681		K.L
R	EO # 12016	5/83	CP
S	EC # 12195	10-6-83	RFE
T	EO # 12196	10-18-83	RFE



NOTE:

1. FOR 50 HERTZ SYSTEMS ONLY
   C313 .1μF 250V IS ADDED. W1 IS REJUMPERED TO E2-E3.
2. INPUT LINE VOLTAGE SETTINGS:

208 VAC ±10%	JUMPER TB1-5 TO T2-2	QUICK DISCONNECT WHITE TO VIOLET COLOR WIRE
220 VAC ±10%	JUMPER TB1-5 TO T2-3	QUICK DISCONNECT WHITE TO RED COLOR WIRE

	DESCRIPTION	PREP	DATE	APPD
	EO#10367			
	EO# 10722	AE	5-17-80	
	EO # 10852	A.R	3-20-80	
	EAR 20416		7-1-10	
	E.O. # 11010	EA	3-24-81	

	DESCRIPTION	PREP	DATE	APPD
F	ADDED C309, 310, 311	D Hall	10-20-71	
G	EO 10383	K Gunn	11-7-75	
H	E.O. 10370, 10363	K Gunn	6-6-76	
J	E.O. #10367			
K	REVISED	D Hall	0-7-77	

REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED
A	RELEASE		
B	E.O. # 10238		
C	EO#10349	JV	3-9-
D	EO# 10229 REF # 03409	JV	2-22-7
E	EO #10366	D Hall	10-15-7

HIGH VOLTAGE REGULATOR
BOARD A-3 03409-001

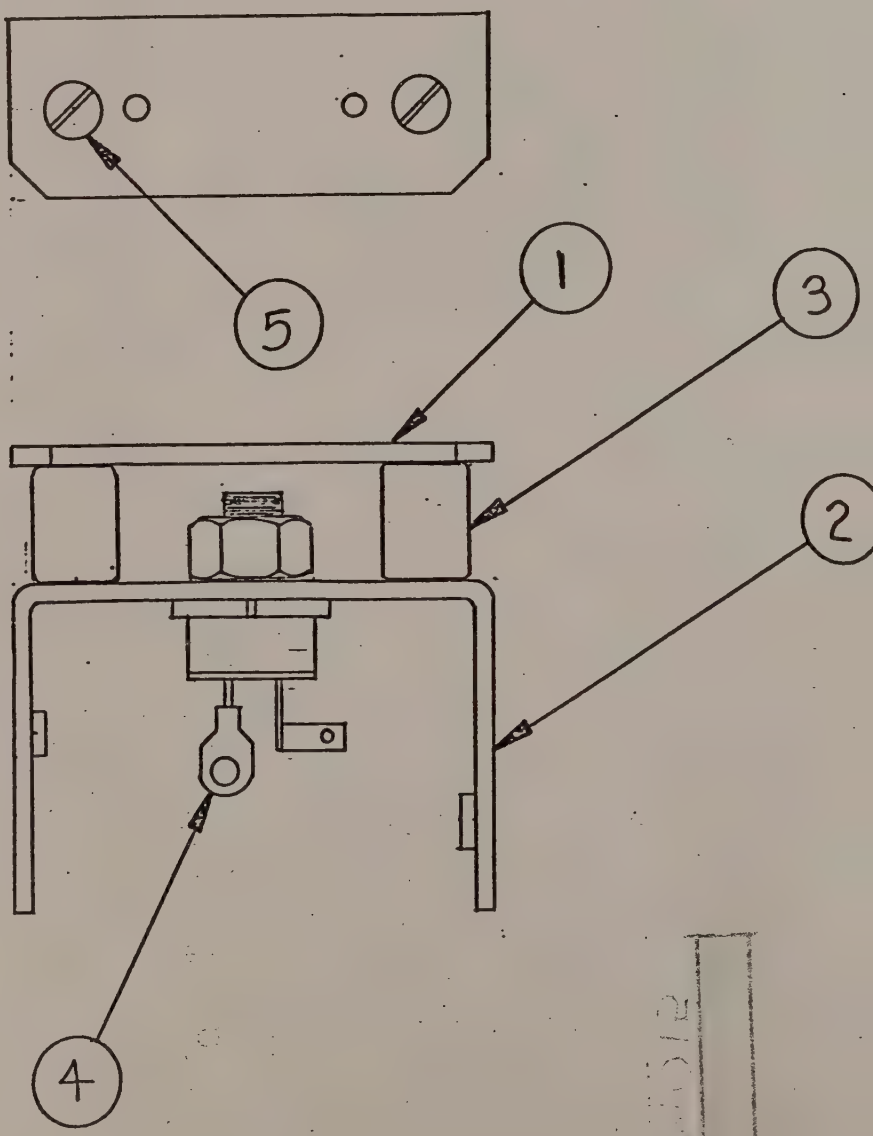
12V SUPPLY
BOARD-A2
03349-0011

PM 112
ELECT SCHEMATIC

SCALE —— SIZE D DRAWING NO. 04111 REV W

DO NOT SCALE DRAWING SHEET 1 of 2

NOTES:



MATERIAL LIST

REF. NO.	DESCRIPTION	PART NO.	QTY.

REV	DESCRIPTION	DATE	CHK	APPR
A	INITIAL ISSUE EO 10792	1-80		

REVISION LEVEL

DIONEX GAS PLASMA DIVISION
31159 SAN BENITO
HAYWARD, CALIF. 94544

DRAWN K. GUINN	DATE 1-9-80	TITLE TRIAC ASSEMBLY PM 112 GENERATOR		
CHECKED	DATE 1-15-80			
ENG.	DATE	DRAWING NO. 06200		REV. A
SCALE FULL		DO NOT SCALE THIS DRAWING	SHEET 1 OF 2	

NEXT ASSY. A04015

SERIE
ASMA PROCESSING SYSTEM
SINGLE CHANNEL